

The Loughton List

**An observing guide for
beginners, members and
anyone else out there.....**

Version 2.0 – Released September 2012

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Forward

Lists of stars are not a new idea in Astronomy. Indeed as Astronomers, we all know or eventually get to know the Messier Catalogue or to give it its proper title “Catalogue des Nebuleuses et des Amas D’Etoiles”. The first edition of the Messier Catalogue included 45 objects and grew to the 103 that are searched for, sketched, imaged, lost, found and talked about by experienced and beginners alike the world over.

Since 1771 when Messier first published his catalogue, technology both optical, radio and infrared has allowed us to see things that he couldn’t have imagined.

Amateur telescope technology has moved on at a pace too. The price point of a seriously good telescope has dropped to affordable levels for almost everyone.

Sadly however, the quality of skies in urban areas has declined markedly. A realistic guide to what you can really see in and around London at the start of the 21st Century has not been so readily available. Most books are written or were written by people who have access to wonderful inky black skies and live nowhere near a major city.

When I started observing 7 years ago (2004), the books that I bought had no resemblance to the 10 or 15 stars I could see visually in that orangey sky over Loughton or my house in Mile End (4 stars). Fortunately for me, I joined a club with people who did know. Those same people have worked together to commit that knowledge to paper.

So what is the Loughton list and why is it relevant today?

- An Urban Astronomers guide - If like me you look up at the sky in London or indeed in any urban city in the UK and want an honest guide to what’s there then this list is for you. It’s a good starting point so you don’t waste time looking for things that you can’t see. It’s also graded for beginners and experts alike.
- An Historical Document - its like the LAS Magna Carta, a survey of what the sky was like in 2011, before it was impossible to see anything from an inner city area.
- A focal point for the society - It’s the first LAS project of the 21st and it’s probably the first that should stand the test of time. It is both a survey and a guide for members. Its something that we can continue to document and update, and add more photographs and drawings to over time

Finally, I cast my mind back to the inception of the project but I can’t honestly remember whose idea it was. I think the seed was sowed at a weekends observing in Kelling Heath . However, clearly Malcolm Zack has played the leadership role in guiding this to its first edition aided and abetted by Steve Richards, Elliss Sharpe, Jonathan Daniels, John McRoberts and Cal Spagnuolo. It has also inspired Allan Bell to computerize it and produce a planisphere on our web page with the objects on it and there are many others. I hope you enjoy using it and I look forward to working through the list with you at our night observing sessions and observing trips.

Clear Skies.

Richard Deighton (Chairman LAS September 2011)

The Loughton List

The idea of a Loughton List was conceived during a Kelling Heath outing when it was cloudy. It is mainly aimed at our new members but will serve as a useful guide for more experienced observers. We started with the concept of about 20 or so objects that beginners could search for and find in a typical year to help learn the sky and point out some famous objects to their family and friends. The criteria were that objects had to be seen reasonably well from Loughton's light polluted and tree and house populated skies without the need to resort to sophisticated instruments, accurate polar alignment and GOTO telescopes.

This meant qualifiers would be mid to high altitudes and typically binocular objects. So some well known but lower declination objects such as M18 or M4 have not made the list, even though some observers would merit their inclusion.

It became clear that 20 was too easy to reach and by the time we had gone round the sky once, the list extended to over 60. In fact the Loughton List in its first incarnation is 75 objects, many very well known which can be found in most popular atlases and observing aids.

This list is not meant to supplant those publications nor, in any stretch of the imagination an attempt for "LL" objects to compete with Messier, Herschel, Caldwell or other noted contributors to the history of astronomical object mapping.

The 75 objects in LL Ver 1.1 are split roughly into 3 lists of bronze, silver and gold. Bronze objects are for the newcomer and many are naked eye or at least visible in good skies. The next 25 present a bit more of a challenge and may be seen well in small telescopes with a bit more power than typical binoculars. Some of our favourites are

admittedly more of a challenge, but we like them and they are well within the reach of observers with a bit of experience, a good map and patience. These qualify for our Gold objects. We may in future editions add more items to all three levels and even add a fourth platinum level – but that is for another time.

Each list member has a designation of LL(n) and its own page explaining its official designation, why we like it, some basic maps and images and how to find it using star hopping techniques.

A full list is found on the following page and this list can be sorted by constellation, type, or position. The sorted lists are included in the appendix

The LL is not meant to replace atlases either and beginners are recommended to obtain a basic star map to learn the constellations. Infact readers should attempt to learn some of these first as they form the signposts for the objects in the list.

Maps and images have been obtained from Wikipedia and other publically available internet based sources. We have acknowledged all those we can. Any omissions are unintentional and will be corrected in future editions. **LAS members are encouraged to submit their own images and sketches which will replace the external ones as we release new versions.**

Our thanks go to the following contributors to the document
Malcolm Zack , Steven Richards, Elliss Sharpe, John McRoberts
Richard Deighton, Jonathan Daniels and Cal Spagnuolo

Best wishes and enjoy the skies!

Malcolm Zack - September 2011

The Loughton List – update version

2.0 issued September 2012.

Version 2.0 was finalised over summer 2012. The basic content and structure is unchanged although we have made some textual corrections and replaced some of the images from versions 1.1 and 1.2 with those by members. It is our intention to have as many of the LL objects imaged or drawn by members and these will be added over time.

The main addition to the Loughton List is the creation of a Loughton List Marathon. The idea is not ours. It was suggested to us by a member of the audience at the 2012 Isle of Wight Star Party during our presentation of the List. Many thanks!

We have compiled a suggested set of marathons for each quarter of the year although in theory other than during summer, most of the LL objects are visible. For details of our LL marathons and explanation of the LAS e sphere – please refer to the LL Marathon section at the end of the list, just before the appendix.

As always, this is a collaboration among amateur astronomers and none of us are perfect. There are no doubt some errors in the text, which are unintentional and the product of too many late nights whilst juggling the challenges of life, family, work, the universe and everything. So if you spot a googly, don't get mad, just let us know and we will be happy to amend it for the next release.

Malcolm Zack September 2012

LL(n)	Formal name	Constellation	Grade	Type
LL1	M42	Orion	Bronze	Nebula
LL2	M45	Taurus	Bronze	Cluster
LL3	Hyades	Taurus	Bronze	Cluster
LL4	M37	Auriga	Bronze	Cluster
LL5	Double Cluster	Perseus	Bronze	Cluster
LL6	Mizar/Alcor	Ursa Major	Bronze	Double
LL7	Andromeda Galaxy	Andromeda	Bronze	Galaxy
LL8	Melotte 20	Perseus	Bronze	Cluster
LL9	M35	Gemini	Bronze	Cluster
LL10	M36	Auriga	Bronze	Cluster
LL11	M38	Auriga	Bronze	Cluster
LL12	M34	Perseus	Bronze	Cluster
LL13	NGC 957	Perseus	Gold	Cluster
LL14	NGC 457	Cassiopeia	Bronze	Cluster
LL15	Double Double	Lyra	Bronze	Double
LL16	Alberio	Cygnus	Bronze	Double
LL17	M44	Cancer	Bronze	Cluster
LL18	Melotte 111	Coma Berenices	Bronze	Cluster
LL19	Coat Hanger	Vulpecula	Bronze	Cluster
LL20	Delphinus	Delphinus	Bronze	Constellation
LL21	M27	Vulpecula	Silver	Nebula
LL22	M11	Scutum	Silver	Cluster
LL23	M13	Hercules	Bronze	Globular
LL24	M15	Pegasus	Silver	Globular
LL25	M51	Canes Venatici	Silver	Galaxy
LL26	M92	Hercules	Silver	Globular
LL27	M16	Serpens Cauda	Silver	Nebula
LL28	M10	Ophiuchus	Silver	Globular
LL29	M12	Ophiuchus	Silver	Globular
LL30	M24	Sagittarius	Gold	Star Cloud
LL31	M33	Triangulum	Gold	Galaxy
LL32	Cheshire Cat	Auriga	Gold	Asterism
LL33	M39	Cygnus	Silver	Cluster
LL34	M65/66	Leo	Gold	Galaxy
LL35	M71	Sagitta	Gold	Globular
LL36	M81/82	Ursa Major	Bronze	Galaxy
LL37	M87	Virgo	Gold	Galaxy
LL38	M57	Lyra	Silver	Nebula

LL(n)	Formal name	Constellation	Grade	Type
LL39	Garnet Star	Cephus	Silver	Star
LL40	Algol	Perseus	Bronze	Variable
LL41	M41	Canis Major	Gold	Cluster
LL42	IC4665	Ophiuchus	Bronze	Cluster
LL43	NGC 1647	Taurus	Silver	Cluster
LL44	Engagement Ring	Ursa Minor	Silver	Asterism
LL45	Izar	Bootes	Silver	Double
LL46	Iota Cancr	Cancer	Silver	Double
LL47	M67	Cancer	Bronze	Cluster
LL48	Mu Draconis	Draco	Gold	Double
LL49	16, 17 Draconis	Draco	Gold	Double
LL50	NGC 7209	Lacerta	Gold	Cluster
LL51	NGC 7789	Cassiopeia	Gold	Cluster
LL52	NGC 752	Andromeda	Silver	Cluster
LL53	Col 69	Orion	Bronze	Cluster
LL54	Col 70	Orion	Bronze	Cluster
LL55	NGC 2169	Orion	Gold	Cluster
LL56	Stock 2	Cassiopeia	Gold	Cluster
LL57	Kembles Cascade	Camelopardalis	Silver	Asterism
LL58	NGC 1981	Orion	Silver	Cluster
LL59	M3	Canes Venatici	Silver	Globular
LL60	Cor Corali	Canes Venatici	Silver	Double
LL61	Mini CoatHanger	Ursa Minor	Gold	Asterism
LL62	Kappa Bootis	Bootes	Silver	Double
LL63	Iota Bootis	Bootes	Silver	Double
LL64	Picot 1	Bootes	Gold	Double
LL65	M5	Serpens Caput	Silver	Globular
LL66	Mu Hercules	Hercules	Gold	Double
LL67	Ux Draconis	Draco	Gold	Carbon Star
LL68	39 Draconis	Draco	Gold	Double
LL69	Kemble 2	Draco	Gold	Double
LL70	Coll 350	Ophiuchus	Silver	Cluster
LL71	Stephenson 1	Lyra	Silver	Cluster
LL72	M29	Cygnus	Bronze	Cluster
LL73	Toadstool	Delphinus	Gold	Asterism
LL74	M56	Lyra	Silver	Globular
LL75	NGC 7243	Lacerta	Gold	Cluster

The Loughton List

Guide to the Guide. – Each page is structured in the same way.

Description Section:

LL number followed by the official name of the object, what type of object it is, how bright it appears, (naked eye is assumed at 5.0), which constellation it is in, and its coordinates

Why we like it box:

What it looks like and how to observe it. How it appears in different types of instruments

Time of the night to see it according to the time of year. This guide assumes an average observing point of 11pm.

An indication of which type of instrument to view it with and how well it may appear. Some objects look better in low power wide field views.

LL1 M42

LL1 is also known as Messier 42.
Type of object: Nebula

Magnitude : Naked Eye 4.0
Where is it? Orion – marks the sword of the hunter,
Coordinates]

Why we like it.

To the naked eye M42 is a wispy smudge just an outstretched thumb's width below the three stars that make up Orion's belt. In dark skies, you can detect its winding shape and the bright constituent stars within it. Always a favourite, a wide field view with a pair of binoculars shows nearby stars framing the nebula as it sails through the sky. With medium powers a telescope will reveal the Trapezium, 4 young stars. Just south is Iota Orionis and in binoculars you should be able to see a tight double star called Struve 747. LL1 is also near to a loose cluster of stars called NGC 1981, also known as the "running man" When using binoculars or a telescope take your time for your eye to appreciate the subtle details of the cloud. At higher powers you will be able to see some structure.

When to see it.

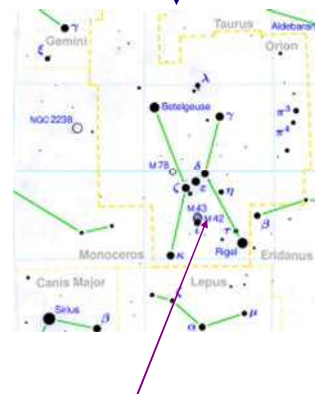
Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	***
Binoculars	****
Up to 100mm	*****
Up to 150mm	*****
200mm	*****

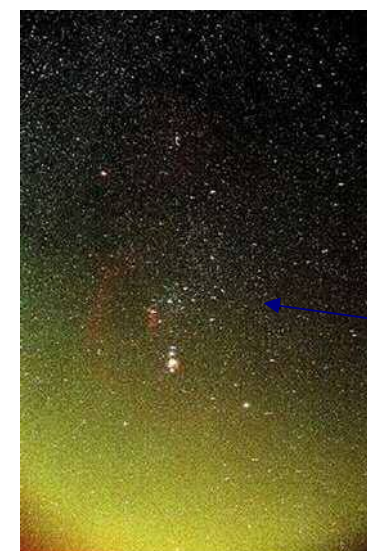
Map and pictures . Image by LAS member Ellis Sharpe

A map of the area or constellation where the object can be found with perhaps some star hopping guidance



How to find it.

Look for Orion's belt of the three stars. These will be low in the east during autumn but as you hit mid winter they will be halfway up the sky in the middle of a rectangle formed by Betelgeuse a giant red star and Rigel a bright, young bluish white star. M42 is almost underneath the second of the belt stars.



An image, sketch or diagram providing some idea of how the object looks.

Star hopping guide to find the object. The guidance assumes that the reader can find the region of the sky, constellation or major star used to start the hop by reference to a star atlas.

The Loughton List



1 The 37 Cluster - one of the LL objects in Orion

LL1 M42

LL1 is also known as Messier 42.

Type of object: Nebula

Magnitude : Naked Eye 4.0

Where is it? Orion – marks the sword of the hunter,

Coordinates]

Why we like it.

To the naked eye M42 is a wispy smudge just an outstretched thumb's width below the three stars that make up Orion's belt. In dark skies, you can detect its winding shape and the bright constituent stars within it. Always a favourite, a wide field view with a pair of binoculars shows nearby stars framing the nebula as it sails through the sky. With medium powers a telescope will reveal the Trapezium, 4 young stars. Just south is Iota Orionis and in binoculars you should be able to see a tight double star called Struve 747.

LL1 is also near to a loose cluster of stars called NGC 1981, also known as the "running man" When using binoculars or a telescope take your time for your eye to appreciate the subtle details of the cloud. At higher powers you will be able to see some structure.

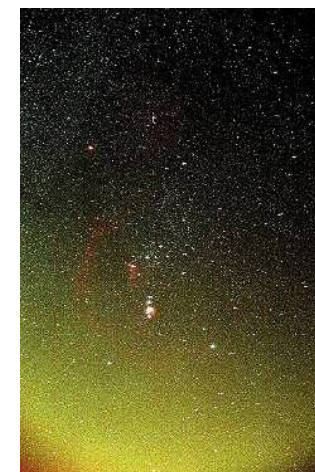
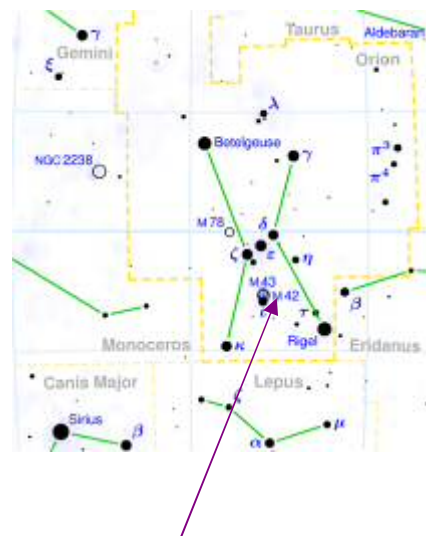
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	**
Binoculars	***
Up to 100mm	****
Up to 150mm	*****
200mm	*****

Map and pictures . Images by LAS member Ellis Sharpe



How to find it.

- Look for Orion's belt of the three stars.
- These will be low in the east during autumn
- As you hit mid winter they will be halfway up the sky in the middle of a rectangle formed by Betelgeuse a giant red star and Rigel a bright, young bluish white star.
- M42 is almost underneath the second of the belt stars.

LL2 M45 - The Pleiades

LL2 is also known as The Pleiades, the Seven Sisters or formally as M45.

Type of object Open Cluster

Magnitude N/A Naked Eye.

Where is it? Taurus the Bull, Coordinates]

Why we like it.

LL2 is the brightest object in the Loughton List, visible to the naked eye even in poor skies. In a pair of binoculars of any standard size, the cluster is truly beautiful and a must see for all beginners and casual observers. Even experienced astronomers take time out to marvel and enjoy viewing. It looks a bit like the plough but has a background sprinkling of other stars just itching to be seen. Truly inspiring, this object has helped many observers, young and not so young start their astronomical journey.

A telescope at lower power up to about 20-25 with a wide field eyepiece brings even more to the viewer but beyond this, the effect is less dramatic. LL2 heralds the start of autumn and the promise of the dark skies of a UK winter. Keep this showpiece on your itinerary.

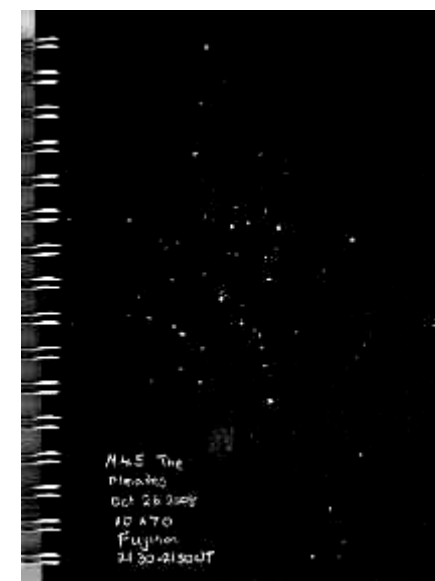
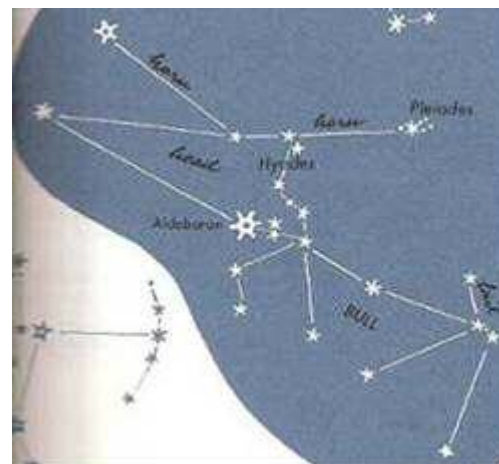
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	***
Binoculars	****
Up to 100mm	***
Up to 150mm	* (fine at low powers)
200mm	* (fine at low powers)

Map and pictures. The sketch is by one of the LAS members, Malcolm Zack using a pair of 7*10 binoculars, white pencil on black art paper.



How to find it.

- Find the bright star Aldebaran using a star atlas.
- It has an orange hue and in good skies is surrounded by the stars of LL3 (the Hyades). In some star charts, M45 marks one of the horns. Move diagonally upwards and to the right (2 o'clock) when the constellation is rising and more downwards when it is setting.
- Using Binoculars, M45 can usually be found by line of sight and lining up your instrument that way.
- A star finder in a telescope or a red dot finder is just as effective, but keep to your lowest power and widest field of view.
- A star atlas will tell you about the brightest stars and the nebulae that can be seen around them.

LL3 The Hyades

LL3 is also known as The Hyades Cluster.

Type of object Open Cluster

Magnitude N/A naked eye

Where is it? Taurus

Why we like it.

The Hyades form a pretty V shape around Aldebaran. Visible to the naked eye as a small group of stars, binoculars at X7 to x 10 will show an interesting collection of stars and shapes. It's about 6 degrees across the sky so X7 is best. Aldebaran is not actually part of the cluster which is about 150 light years away, but about 80 lt yrs closer. However it's a pleasing cluster. Look out for Epsilon at the top of the V and trace down to Gamma and then back up the V towards Aldebaran. Its appealing because its simple to find and shows what binoculars can do for the garden astronomer. Don't bother with telescopes on this one unless you can get it down to under 12x.

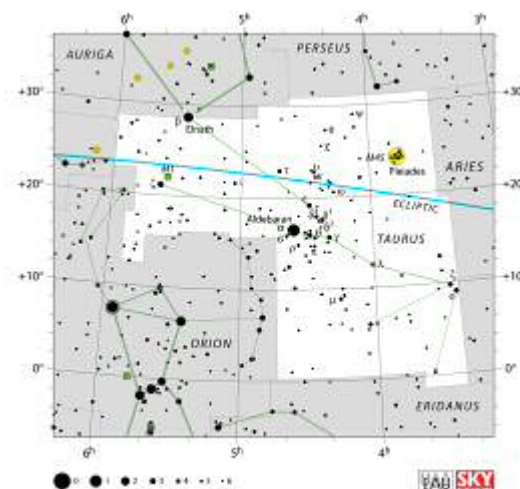
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	***
Binoculars	*****
Up to 100mm	*
Up to 150mm	*
200mm	*

Map and pictures



How to find it.

- Go straight to Aldebaran.
- Centre your binoculars on it and then move slightly right putting Aldebaran towards the left of the field.
- You should be able to see the whole of the V in view.

LL4 - M37

LL4 is also known as	M37
Type of object	Open Cluster
Magnitude	6.2
Where is it?	Auriga, Coordinates]

Why we like it.

M37 is the first of the Loughton List's more challenging objects for beginners. It remains in our Bronze section because once found, it will soon become a favourite especially if you can get your hands onto a telescope at medium powers. It is however naked eye visible in clear and dark skies. M37 is one of three Messier clusters near to each other in Auriga and is almost in the same binocular field as M36.

It wins its place due to its expansive, swirling extending arms that really come out at around x75. In bins it is a bright circular smudge at the eastern side of the constellation. Due to its position it's almost always visible to UK observers and from late September onwards is a feature for evening skies but will be one to pick up well into late spring.

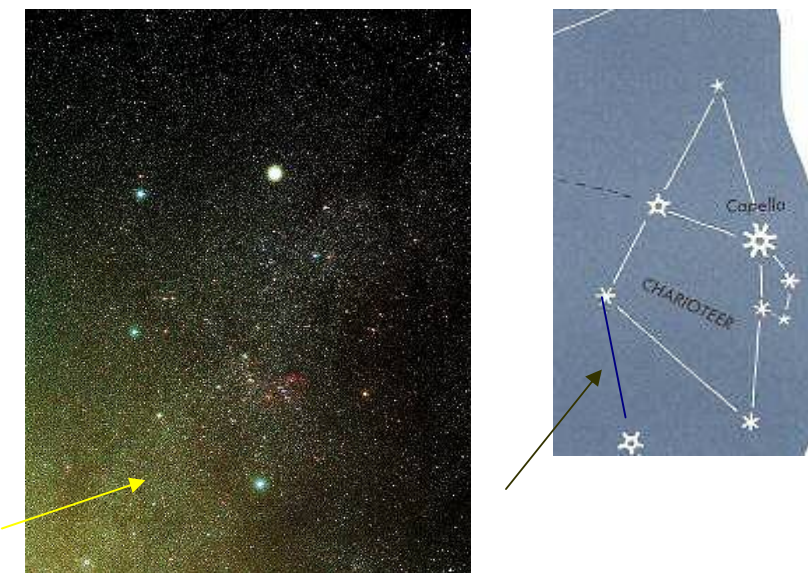
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	★
Binoculars	★★
Up to 100mm	★★★
Up to 150mm	★★★★
200mm	★★★★

Map and pictures View of Auriga taken by LAS member Elliss Sharpe from Kelling Heath, Norfolk 35mm film.



How to find it.

- First check you have Capella from your star charts. It's a long way from here but this confirms you have the right constellation.
- Next, I find it easiest to locate one of the brighter stars in Taurus – Beta, also known as El Nath.
- Some older atlases show El Nath as part of Auriga and others shared with Taurus. Having got El Nath, draw a line to Theta.
- M37 is to the left of the line and roughly in the middle, perhaps 60% of the way towards Theta.
- While in the vicinity, pop over an equal distance from the line to the other side and you should find M36. M36 is included later on our Loughton List but is worth noting as it's a similar brightness. Remember M36 for a trip later to see the Cheshire Cat, one of our Silver rated Loughton List objects.

LL5 The Double Cluster

LL5 is also known as NGC 869 and NGC 884 – the Double Cluster.

Type of object Open Clusters

Magnitude 5,3, 6.1

Where is it? Perseus, Coordinates

Why we like it.

Glorious and spectacular, The double cluster marks the sword of Perseus at its northern edge. In a rich part of the Milky Way, all forms of visual aid shows these two well. The wide view of bins are best when finding these first but when you are familiar with them, boost the power if you have a telescope up to the 40's, 50s and beyond. Even from suburban skies they hold up well. At first glance they look similar but take your time to look for shape and structure. They are only about 13 Million years old which means they were virtually born yesterday in stellar terms! Also nearby are other items, not on our list but found in most atlases. Look out for Stock 2 just north of the pair if you have good skies but on the whole enjoy.

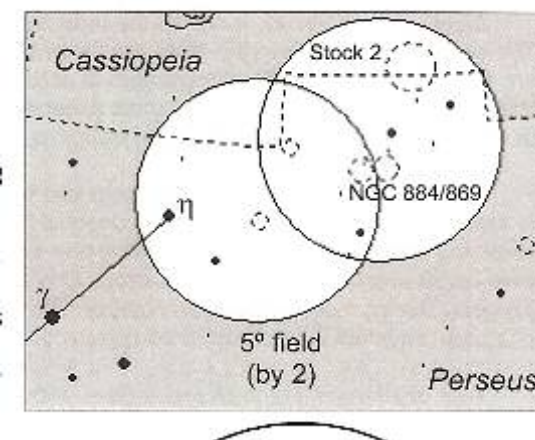
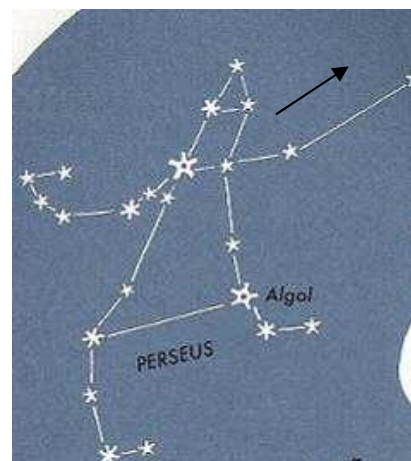
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	**
Binoculars	***
Up to 100mm	****
Up to 150mm	*****
200mm	*****

Map and pictures



How to find it. Take a look at Perseus.

- What you need to find first is his hat which is the triangle at the top. In suburban skies this can be a bit faint, especially if you start looking for it in early autumn when its still quite low in the sky above the north eastern horizon.
- Once you have got it, put your bins onto the top star. Now move up a bit and towards the right about the same distance as the height of the triangle.
- They will jump out at you, but if not go back to the hat again and scan slowly away from it.
- If you start this is the autumn as its rising in the east, its generally upwards towards 1 o'clock from the top of the hat.
- Some observers suggest starting from Epsilon Cassiopeia and drawing a line from that to the top of the hat. The clusters are 70% of the way from Cassiopeia to Perseus and to one side of that line.
- Tip: The clusters get very high during mid to late autumn, so that can make star hoping a bit more of a challenge so be sure to try this when its at a manageable altitude. This is one to practice so that you can find it wherever Perseus is in the sky.

LL6 Mizar/Alcor

LL6 is also known as Mizar and Alcor.
 Type of object Visual double star
 Magnitude []
 Where is it? The Great Bear – Ursa Major,
 Coordinates]
 Why we like it.

This is a great one to show your family because it's an optical double visible to anyone who has good eyesight. Infact the ancients used it as an eye test. The stars are not related, just lie in the same line of sight and is visible all year round.

If you can split it with the naked eye then your eyes are good and you needn't go to Specsavers. If that fails, point any small instrument to it, even a 6*30 finder and the stars appear.

If you use x10 or higher powers you should be able to see a third star.

When to see it.

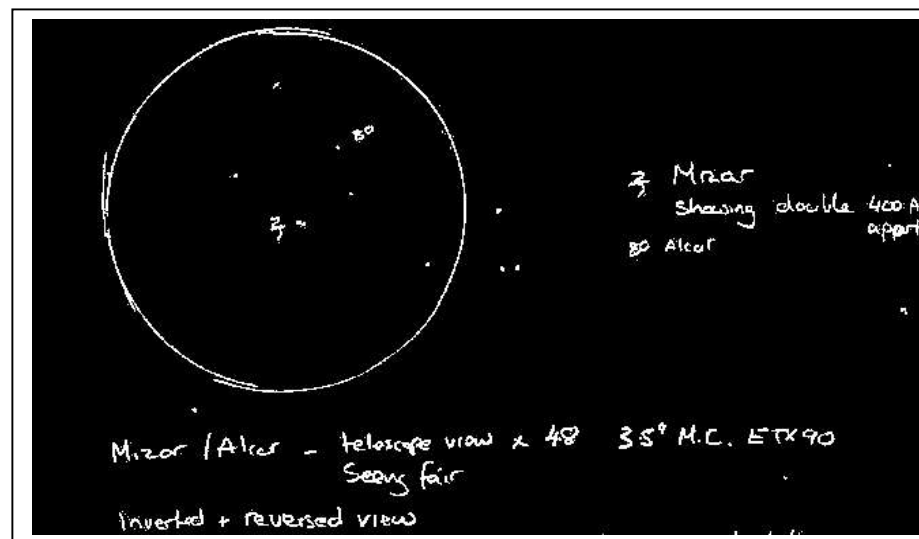
Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night rising in the east and up to the south	Dusk or just before dawn overhead	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it. [some objects look better in smaller instruments]

Naked Eye	***
Binoculars	***
Up to 100mm	*
Up to 150mm	*
200mm	*

Map and pictures

Sketch by malcolm Zack through a 90mm Maksutov Cassegrain x48.
 The view also shows Mizar A.



How to find it. The double is the second star in from the left in the famous Plough which forms part of the Great Bear. Look north and locate this asterism which will be low in the winter and high in the spring.

LL7 M31

LL7 is also known as	Messier 31
Type of object:	Galaxy
Magnitude :	Naked Eye 4.0
Where is it?	Andromeda, just above the brighter stars in the constellation

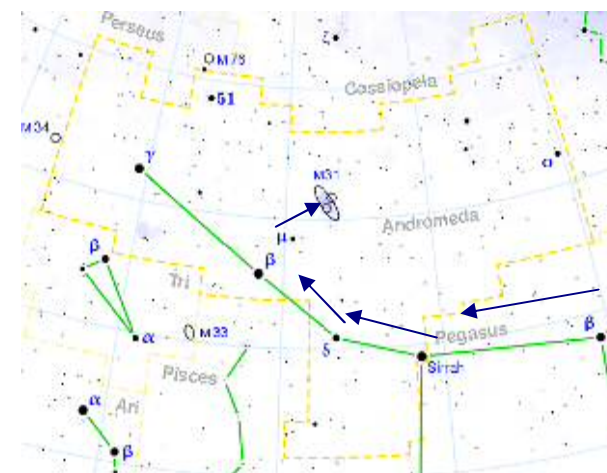
M31 – the Andromeda Galaxy is our major neighbour to our own Milky Way Galaxy. A view through binoculars or a telescope won't match the colours of your atlas but its stunning for being similar to our own galaxy and just 2.9 million light years away. It is infact very large and in really good skies its length will fill a fair part of your binocular view. In light polluted skies we can only see the central core but with practice you will get to enjoy viewing this galactic neighbour which is actually rushing towards our own Milky Way and will interact in about a billion years time. To find this, put the telescope away – this is a test of your constellation and hopping skills. GOTOs will pick it up easily, the pleasure is finding this one at a star gathering in something as simple as bins. Higher power ones at 15 plus give better views but start with lower powers Low powers remain best for overall viewing but if you get a chance to look through a large scope say an 8 or 10 inch, do so.

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Generally not visible expect low in North	Rising in early hours - to seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	**
Binoculars	***
Up to 100mm	****
Up to 150mm	*****
200mm	*****



How to find it. You

need to learn some of the stars in the constellations of the great square and andromeda. None of these are very bright.

- Look at the top of the square and join the stars together in a line. Then continue east (that's left) and go about the same distance again to a similar star – that's Delta.
- Then do it again. You are now at a star called Beta Andromedae. The next one on is Gamma Andromedae which is infact a red double star. Not in our list yet but worth noting.
- Now. Place your bins on Beta. Move upwards if you are observing this in the early Autumn in the east. Move slowing taking in the two marker stars shown on the chart.
- These are roughly 7 degrees up from Gamma so in a 7*50 field of view. Move to the top marker and then slightly right. M31 will be a distinct smudge of light. If you practise in fair skies then when you get an opportunity to view in dark skies you will enjoy a super view.



LL8 Melotte 20, The Alpha Persei Association.

LL8 is also known as Melotte 20.

Type of object: Star Cluster

Magnitude : Naked Eye 4.0

Where is it? Perseus around its brightest star on the left side of the constellation Coordinates]

Why we like it.

This is one of the best open clusters in the Northern Hemisphere and at around x20 probably matches M45 for its shape, style and content. Alpha Persei is also known as Mirphak. There is a sweeping arc or V running away from Mirphak joined by a few other bright members stretching towards Delta which is further down his shoulder. The cluster is about 3 degrees wide or 6 moon widths so comfortably held within bins at x10 to x15. if you can get a pair of 20 * 70 or 80 on these you will be well rewarded as there are several colour contrasts. A good one to get you going as you march through the night and is visible for most of the year, best being autumn and winter.

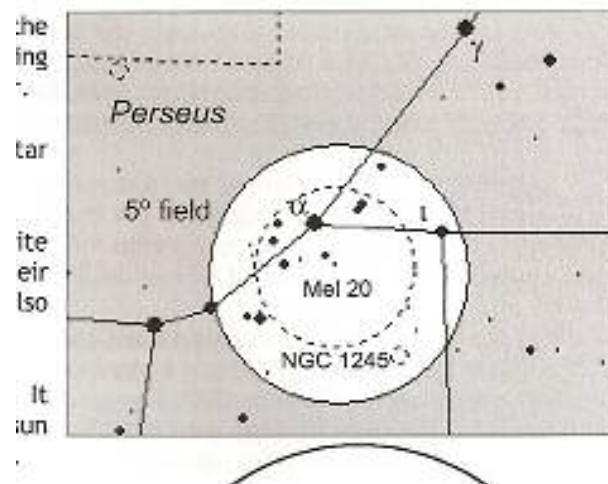
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Low in east first of all in evening, rising steadily.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	**
Binoculars	****
Up to 100mm	****
Up to 150mm	***
200mm	**

Map and pictures



How to find it. Look at Perseus again.

This time select the brightest star which is on the left side.

That's Mirphak so gently guiding your binoculars to it will help you find the cluster.

As always use your lowest power first of all but this is quite easy from x10 upwards.

LL9 M35

LL9 is also known as Messier 35.
Type of object: Open Cluster

Magnitude : Naked Eye 5.1
Where is it? Gemini – near their feet

Why we like it.

Pretty and and a good test of observation skills and star hopping. I am sure this will become one of your favourites. Even in light polluted skies, it sparkles. It is about 3000 light years away and 150 millions years old and detectable to good eyes in good skies. There is some shape to it and is striking in modest binoculars. Most of the stars seem white but there are a few of a reddish or yellow hue. A telescope of say 100mm at medium powers of 50 reveals a spread about the same size as a full moon. Whilst looking at LL9, you may see a small companion cluster which is NGC2158 this is far older (2 billion years) and 12000 light years away. You'll need to view it through a larger aperture scope say a 5 or 6 inch to see this well. GOTO telescopes may be best for 2158 to ensure you are centred on the right cluster but M35 itself is easy to find by star hopping

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	**
Binoculars	***
Up to 100mm	****
Up to 150mm	***
200mm	***

Map and pictures

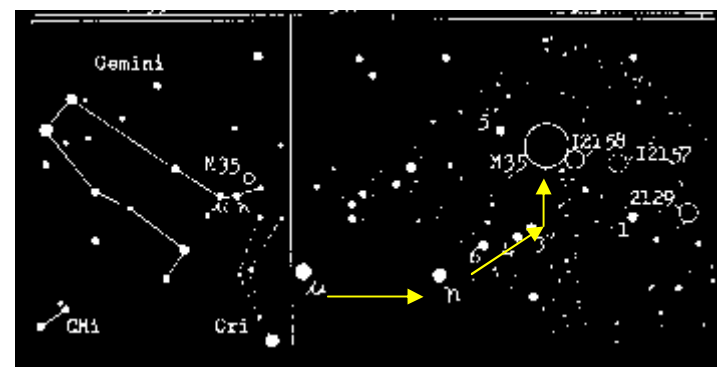
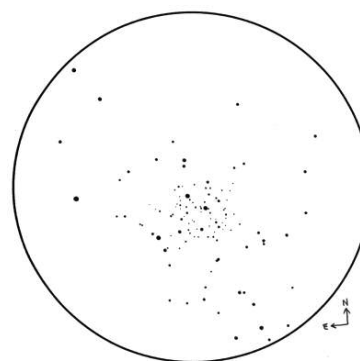


Image from Internet: M35 120mm Skywatcher refractor at x 36



How to find it. In early Winter the twins rise in the east lying on their side so you want to find the western bit (mostly to the right) part of the higher twin. This marks his feet and I usually look for Mu before sweeping in an upwards curve through Eta and 1 Gem and holding these in the lower part of my binocular view.

- M35 or the ninth item in the Loughton List should be in the top half of your field of view.
- Using a finder in the same way for unguided scopes it can be located with a bit of practice and then should be in your field of view in the scope.
- Always use low powers first. Practice this binocular sweep and you will usually find M35 quickly. If you continue onwards past M35 towards Auriga you will run into M37 or LL4 in our list.

LL10 M36

LL1 is also known as M36.
Type of object: Cluster

Magnitude :

Where is it? Auriga –near to M37 and M38 in the eastern half of the constellation.

Why we like it.

M36 is a compact cluster that lies between M37 (LL4) and M38 (LL11) in a fabulous region of the northern autumn/winter night sky. Binoculars will find all three objects sailing gently through night as Auriga turns around the pole. They are close enough to be seen in the same field there or thereabouts and once you have located all three – they are a great way to get your observing session going. In dark skies they are visible to the naked eye. M36 is more compact than the other two but possibly the easiest to spot. If you can get a scope onto this you will be rewarded with a bright cluster, with a possible suggestion of a cross or curving arms (see Malcolm's sketch). A power of about 75 will do it justice. According to Sue French (Celestial Sampler) these objects were first logged by Giovanni Hodierna of Sicily although they were formally named by Messier in his catalogue.

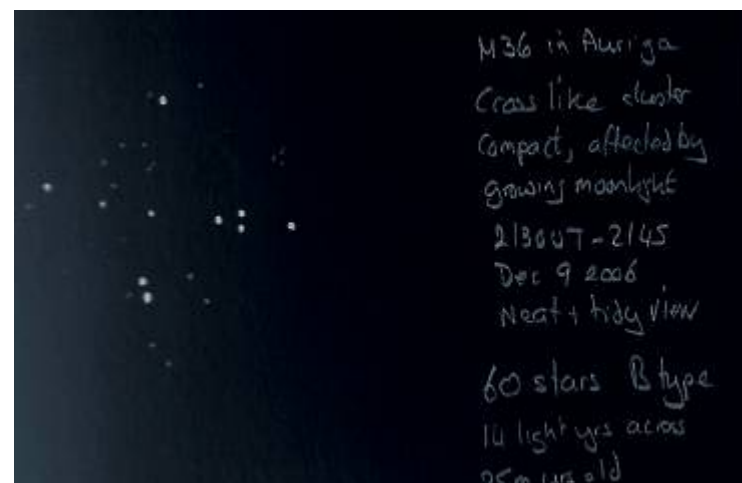
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night. A good time to observe	Dusk or just before dawn. – Best avoid.	Rising in early hours - to well seen from midnight	Sunset onwards. – Medium to high

How best to see it.[some objects look better in smaller instruments]

Naked Eye	***
Binoculars	****
Up to 100mm	*****
Up to 150mm	*****
200mm	*****

Map and pictures [Image: - Elliss Sharpe 35mm Film. Sketch, Malcolm Zack, December 2006, Maksutov Newtonian 6 inch at x 50.



How to find it.

- Rather like LL4 – M37, the starting point is to find Auriga, its main star Capella and draw a line between Theta and El Nath which is shared with Taurus.
- M36 is the other side of the “line” from M37

LL11 Messier 38

LLn is also known as Messier 38
Type of object: Open Cluster

Magnitude : 6.9
Where is it? Within Auriga RA 5h 28.7m Dec 35 50'

Why we like it.

One of the trio of attractive open clusters in Auriga, Messier 38 is the faintest of the three and will appear as a fuzzy patch through binoculars. Any telescope larger than 66mm should resolve the cluster at about x40 and from a dark site with a medium size telescope up to 100 stars are visible, in the Loughton area though with a similar size telescope you will probably see around half that number.

Open clusters are good targets in light polluted areas and this is no exception as it has a high surface brightness. It is relatively easy to find if you point a telescope at low power x20-x30 a third of the way between El Nath and Capella.

This cluster lies close to LL32 – The Cheshire Cat and LL10 – Messier 36.

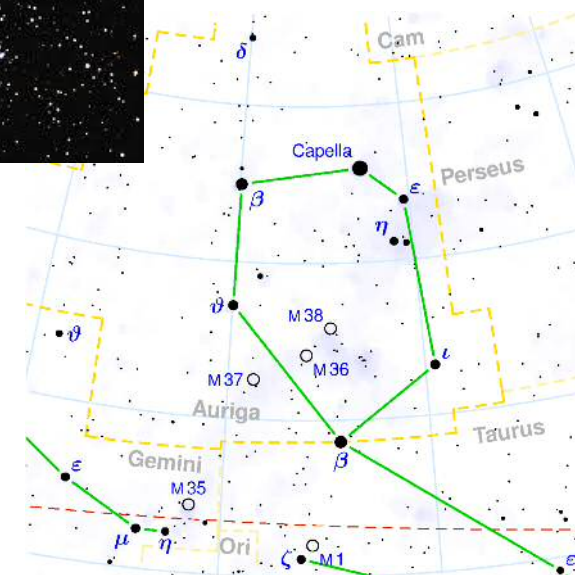
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	★ ★
Up to 100mm	★ ★ ★ ★
Up to 150mm	★ ★ ★ ★
200mm	★ ★ ★ ★

Map and pictures



How to find it.

- Refer to the guides to M36 and M37 (LL10 and LL4). Once you have these, M38 is a similar looking object right in the middle of Auriga.
- Use a wide-field eyepiece or binoculars and look about a third of the way up from El Nath (Beta Tauri) towards Capella.
- Sometimes its easier to locate M37 and M36 and continuing the line drawn between the two north westwards

LL12 – Messier 34

LL12 is also known as Messier 34

Type of object: Open Cluster

Magnitude : 5.5

Where is it? In Perseus and RA: 02h 42m DEC: +42 47'

Why we like it.

A fairly bright open cluster which is easy to find with binoculars even from light polluted skies. From a dark site it can even be glimpsed by the naked eye as a fuzzy spot.

It contains about 80 stars with some around magnitude 8 in brightness. It is quite a big cluster about the size of a full moon and as such looks at its best medium sized telescope at low power (x20-x30).

It was discovered by Messier in 1764 and lies about 1500 light years away and is thought to be around 100 million years old. The closest bright star Algol, the demon star is the skies most famous variable and is LL40 in our list.

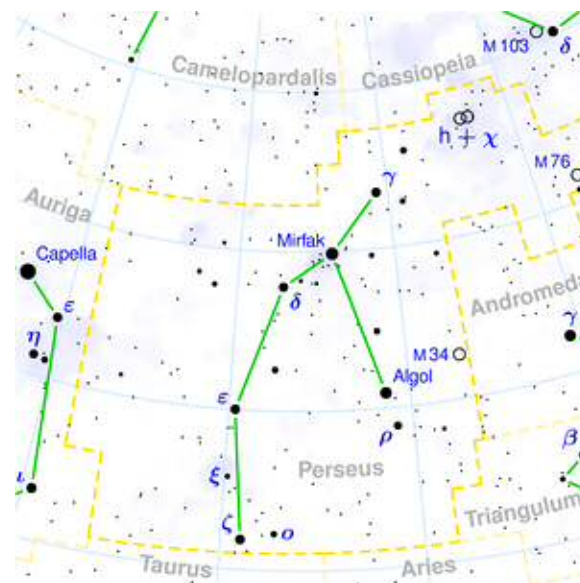
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - early hours of morning	Dusk or just before dawn	well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	★
Binoculars	★★★
Up to 100mm	★★★★
Up to 150mm	★★★
200mm	★★★

Map and pictures



How to find it. This can be a challenge first or second time.

- Locate Algol in your binoculars. It's the second brightest star in Perseus
- Then move slowly up and to the right and you should see a shimmering but faint and spreadout mass of stars.
- Not that bright but once you have it, its fairly easy to find again.
- Practice the sweep from Algol a few times and it will become one of your regular in the autumn skies

LL13 NGC 957

LL13 is also known as NGC 957

Type of object: Open Cluster

Magnitude : 7.2

Where is it? Perseus RA: 02h 33m DEC: 57 32'

Why we like it.

This is one of the more challenging open clusters on the list . It is locatable with good large binoculars but a telescope is ideal from 100mm above.

It contains around 30 stars arranged in a triangular shape that will be easily resolved with a larger scope but plenty of shape can be seen with smaller instruments at medium power.

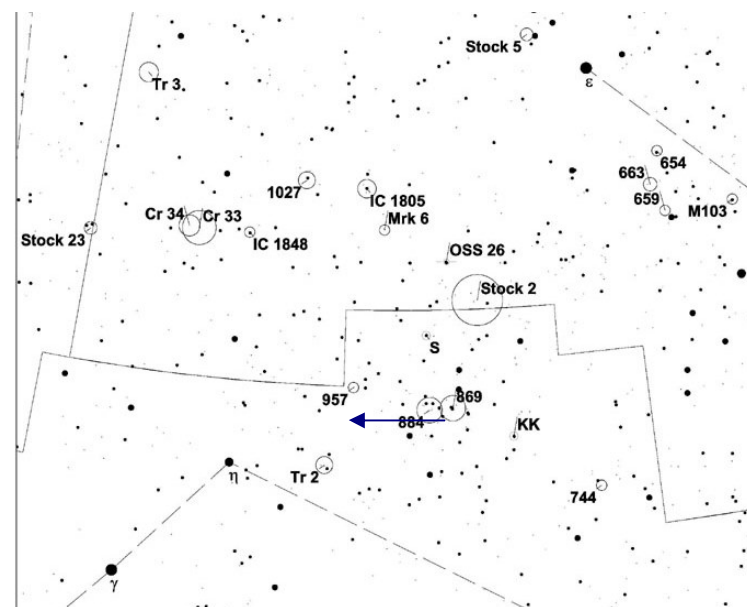
The cluster is thought to be about 3300 light years away. It is relatively small at 11 arc-minutes across.

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	★
Up to 100mm	★★
Up to 150mm	★★★★
200mm	★★★★



How to find it. It is most easily located a little to the east of one of the other major LL objects the Double Cluster.

- We suggest that you find the Double Cluster first and do this in an autumn evening before it gets too high.
- Just move east (Left) to locate the general area. You may spot it in the bins or finder before moving up the power. Note the map shows some other non LL objects such as Trumpler 2 (Tr2) and Stock 2 which are also visible in binoculars and small instruments. A good atlas can show you how to star hop to these as well.

LL 14 The Owl Cluster NGC 457

LL10 is also known as NGC 457, the owl cluster or the ET cluster

Type of object: Open Cluster

Magnitude : 4.0

Where is it? Cassiopeia

Why we like it.

My kids loved this when they first saw it.

A 70mm scope at x25 with a wide field is enough to pick out the shape. The Owl has two bright watchful eyes, bearing down out of the darkness of the night. The brighter one is Rho Cassiopeai and the one to star hop to. Bins may struggle to show the shape at lower powers but x20 will do it. At powers of 25 to 40 you can see the wings and its central body. There is a suggestion of more stars in the centre of the cluster in small instruments. In a 5 inch scope it is truly a marvel. In the US it is known as the ET cluster and with a bit of imagination, its easy to see why. The Owl, however has that feel of the night about it, so be sure to catch the bird as you swoop around the constellation.

When to see it.

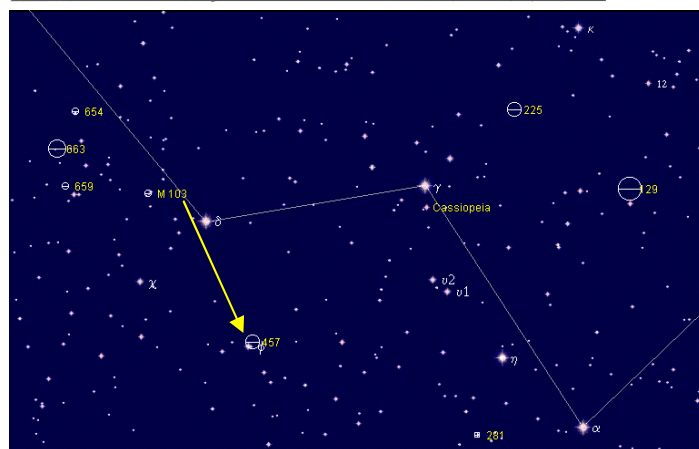
Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	**
Binoculars	***
Up to 100mm	****
Up to 150mm	*****
200mm	*****

Map and pictures

Sketch by Malcolm Zack MN 66 x 47 – Chigwell Essex (LAS Gallery).



How to find it.

- Select the second star from the left in the “W”. This is delta. Then move slowly south and west towards Rho Cass.
- This marks the brighter eye of the cluster.
- Once centered in your finder move to your scope and increase the power.

LL15 [Epsilon Lyrae]

LL15 is also known as The double / double
 Type of object: Close binary double star
 Magnitude : 5-7
 Where is it? In the constellation of Lyra

Why we like it.

LL 15 is a famous double star, visible for much of the year.
 Each star is infact a double itself.

This is a challenging double, which is easily split in a pair of binoculars.

But to determine the true nature of this system you have to use a telescope of least 100mm and power of 80X to split the double further into double system themselves.

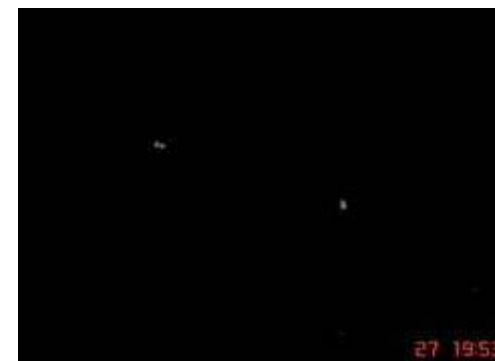
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Overhead in late evening	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	★ ★
Up to 100mm	★ ★ ★
Up to 150mm	★ ★ ★ ★
200mm	★ ★ ★ ★

Map and pictures



The double / double Epsilon Lyrae

How to find it.

- First of all find Vega, which is the bright star in Lyra and forms the summer triangle with Deneb and Altair.
- Most star atlases will show you this famous asterism.
- Once you have it, just shift Vega to the left of your field of view a bit and Epsilon forms a triangle with Vega and the rest of the constellation.
- Providing your finder is well aligned, a telescope will split the stars into doubles.

LL16 Albireo (Beta Cygni)

LL16 is also known as Albireo

Type of object: Double Star

Magnitude : Naked Eye 3/5

Where is it? Cygnus

Why we like it.

Regarded by many as the very finest colour contrast double star in the entire night sky.

A beautiful sight in any telescope and can be resolved at fairly low power (20x) as it has a wide separation of 34 arc seconds. On a steady night it is possible to just resolve Albireo with a pair of 10x50 binoculars mounted on a tripod.

The colours should be visible in any scope. To see the colours more clearly you might want to defocus slightly.

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Early hours	Well seen from around midnight	All night	Sunset until midnight

How best to see it.[some objects look better in smaller instruments]

Naked Eye	★
Binoculars	★★
Up to 100mm	★★★★
Up to 150mm	★★★★
200mm	★★★★

Map and pictures



How to find it. Easy to find with the naked eye at the opposite end of Cygnus from its brightest star Deneb. Alternatively it is at the bottom of the cross which forms the constellation's shape.

Map: www.wikipedia.org

Photo: www.wikipedia.org

LL17 M44 – The beehive

LLn is also known as [M 44].
 Type of object: Open Cluster
 Magnitude : Naked Eye 5.0
 Where is it? Cancer RA 8h 40.1m DEC +19 07m.
Why we like it.

Intricate and fairly bright, M44 is one for mid winter and early spring observing. Its not too high and is best seen at around x 20. All bins will pick it up and X10 will show the central square and dotted “bees” swirling around it.

For a first go use your lowest power, 7x 50's or similar will be most helpful because there are few bright stars nearby. A pair of larger binoculars or a scope at about x20 provide a fabulous view and its well worth trying your sketching skills on this one. The cluster is quite old and 577 light years distant.

Nearby is M67, which although is not on the current LL is well worth a visit and is often overlooked. From M44 relocate alpha. Put Delta in the top of your field of view and move downwards about 4-5 degrees. M67 should pop into view as a faint smudge. If you have light pollution it may be more difficult to see at first.

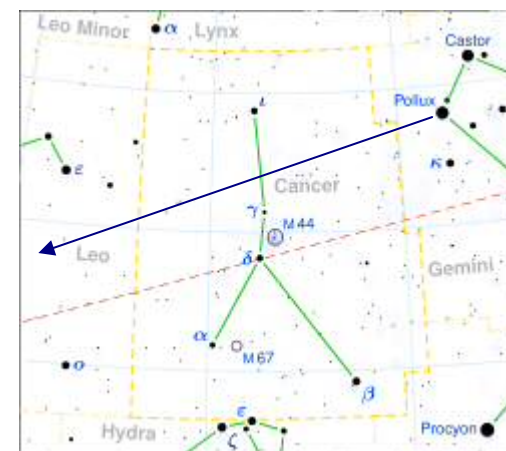
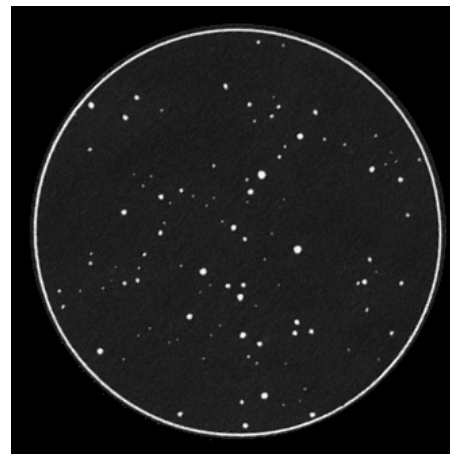
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	★ ★
Binoculars	★ ★ ★
Up to 100mm	★ ★ ★ ★
Up to 150mm	★ ★ ★ ★
200mm	★ ★ ★ ★

Map and pictures Source: Internet –
www.jupiter-jp.net/ike/English/description/M44.htm



How to find it. Start off naked eye. Locate Pollux in Gemini and Regulus in Leo. You need these because Cancer is a faint, boring constellation which is difficult in suburban skies.

Draw a line between Pollux and Regulus. Pollux is the one of the two bright “head” stars in Gemini and the one on the left (east) of the pair.

Regulus marks the base of the backwards question mark in Leo, but don’t worry about that too much, it’s the next bright star you will see moving east from Pollux anyway. Once you have your line, Cancer is in between. M44 is about 2/3 of the way from Pollux and slightly below the line.

Scan from Pollux slowly and you should see the stars that form the box of cancer in the map above. Once you have them, locate delta and move down (south) a bit. If its reasonably clear, M44 will jump out. Once you have it, go back and practice finding it again. By doing this you will get an intuitive feel for where it is and you will be able to go more or less straight to it in the future.

LL18 Melotte 111

LL18 is also known as The Coma Star Cluster or Berenices Hair

Type of object: Open Cluster

Magnitude : Naked Eye 1.8

Where is it? Coma Berenices RA: 12.25 DEC: +26

Why we like it.

One of the largest open clusters by angular size it covers an area of sky approaching 5 degrees.

It is the third closest star cluster to the solar system at 250 light years away. Although it has a seemingly high apparent magnitude it can only easily be seen with the naked eye from a dark site as the brightness is spread over a very wide area. The brightest individual star in the cluster are around 5th magnitude.

It was only identified as a true open cluster bound by gravity as late as 1938 following careful study by Trumpler. The cluster is thought to be about 400 million years old and may be on the point of dispersing completely.

It is one of the best sights of the spring and summer skies with small instruments and one to go for early on in your Loughton List search. In a dark site its visible to the naked eye.

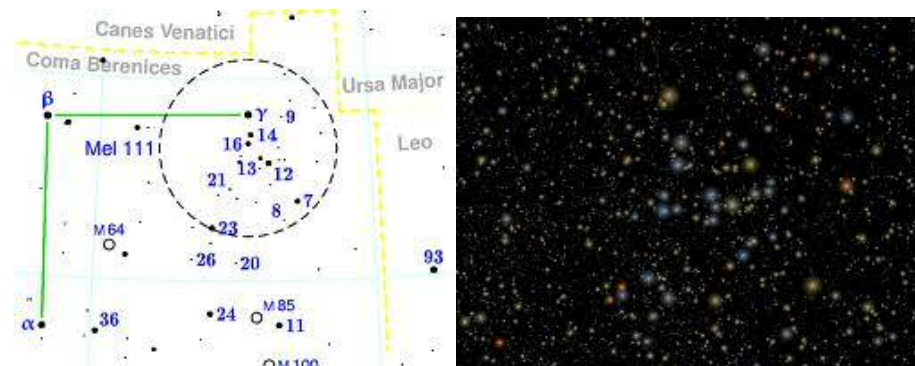
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Late Evening - end of night	Sunset onwards	Setting early evening	Early Hours to dawn.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	★ ★
Binoculars	★ ★ ★ ★
Up to 100mm	★ ★
Up to 150mm	★
200mm	★

Map and pictures:



How to find it. Visible with the naked eye from a dark site. It is easily seen with 7x50 binoculars and found between the constellations of Bootes and Leo in an otherwise fairly empty part of the sky, north of Virgo.

Once you have alpha or beta, move slowly to the west and the cluster will blaze into view.

In fact bins are best at powers below 10. x6 or x7 being ideal.

Map: www.seds.org

Photo: www.wikimedia.org

LL 19 Collinder 399

LL 19 is also known as Brocchi's Cluster.

Type of object: Asterism

Magnitude : Naked Eye 3.6

Where is it? Vulpecula – the Fox in the summer sky near Sagitta the arrow. 19h 25m 24s Declination: +20°11'00"

Why we like it.

Fun object that appeals to all ages. Collinder 399 looks like an upside down coathanger. It looks like a cluster but its just line of sight as the stars are all very different distances from Earth varying from 200 to 1000 light years. To enjoy this one, a pair of bins is all you need, x 10 will show it very well and it can be stunning in the field of x16 or x20 where I have seen some differences in colour. Drawing the object takes about 20 mins, but you will need to have your instrument mounted. In dark skies you can pick it out naked eye with a bit of practice. 10 stars make up the main shape and it stretches for about 1.5 degrees. The star on the corner of the hook is a quadruple star which is not on our list but can be split using an 80mm scope but you need good skies as the companions are at 10th and 11th magnitude. A finderscope will also show Col 399 well.

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Early hours.	Twilight, low in East.	Due south from mid to late evening .	Sunset onwards but declining.

How best to see it. [some objects look better in smaller instruments]

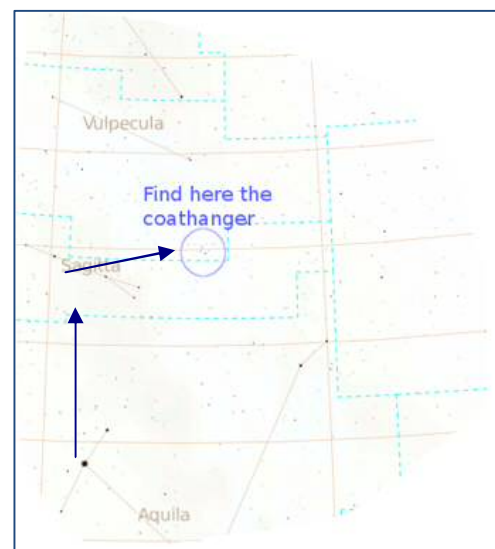
Naked Eye	★★
Binoculars	★★★★
Up to 100mm	★★★
Up to 150mm	★★
200mm	★★

Map and pictures Source of map: wikipedia



Source: - astronnet.ru

How to find it. This is a good test of your star hopping because there are no bright stars nearby other than Altair.



Its south of Alberio, but a common route is to focus on Altair first, placing all three stars in your field of view. Then move upwards about 7 degrees to find Sagitta the arrow.

This should be in your field of view but look carefully and try again from Altair if you miss it.

Holding the arrow in the field move away from it, upwards and right (North and West). If its later in the year then move to the right but downwards a bit. LL19 will move into view. Once you have found it, go back to Altair and star hop again – so that you get used to the journey.

LL20 Delphinus

LL20 is also known as Delphinus the Dolphin

Type of object: Constellation

Magnitude : Naked Eye 3.5 - 4.0

Where is it? Between Aquila and Pegasus.

Why we like it.

This is a small and attractive constellation which I think does look somewhat like what it was named after – a dolphin. I think of it to some extent as something of a herald for the darker evenings of Autumn as it is best seen on summer evenings in August.

It is one of the smaller constellations, ranked 69th in size out of 88. Delphinus was one of the 48 constellations listed by the 2nd century astronomer Ptolemy, and it remains among the 88 modern constellations. The four main stars in a lozenge shape form an asterism known as Job's coffin.

While you are here, if you have a telescope take a look at gamma delphinus an attractive double star which is the nose of the dolphin and can be split by any telescope at about x50.

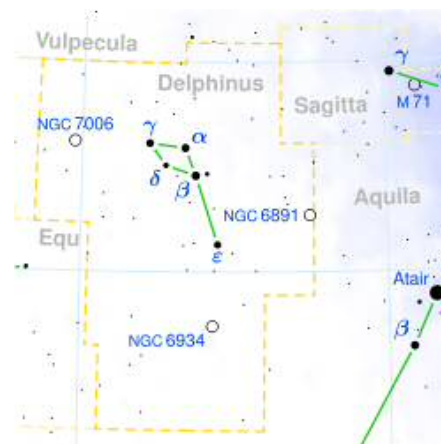
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Early hours – just before dawn	Rising in the early – well seen after midnight	Sunset onwards	Sunset - midnight

How best to see it. [some objects look better in smaller instruments]

Naked Eye	****
Binoculars	**
Up to 100mm	*
Up to 150mm	*
200mm	*

Map and pictures



How to find it.

- Fairly easy to see even in light polluted skies although the main stars are only between magnitude 3.5 and 4.5.
- It is best seen in the evening in late Summer and found between Aquila and Pegasus and a little below Sagitta.

Map: www.wikipedia.org

Photo: www.intersoft.it/galaxlux

LL21 The Dumbell Nebula

LL21 is also known as Dumbbell Nebula M27
 Type of object: Nebula
 Magnitude : 7.4
 Where is it? Vulpecula 19h 59.5' Dec 22 deg 43'N
Why we like it.

Easily visible in binoculars or small telescopes. In a good site the nebula looks quite ghostly, hanging quietly in the summer and autumn sky. Needs a bit of practice to find and averted vision may help.

It's a favourite due to its relative brightness for something of this nature.

The lobes are clearly distinguished in an 8 inch telescope if you are able to access one of these. It looks like an apple core with lobes which come out from a bright centre.

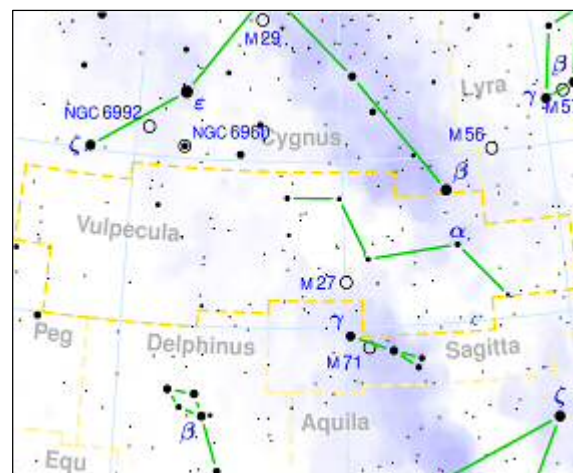
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	*** *
Up to 100mm	***
Up to 150mm	***
200mm	***

Map and pictures



How to find it.

There are two popular ways to find M27. One from Cygnus and one from Aquila.

Cygnus route.

Using binoculars move slowly southwards from Cygnus to Delphinus. M27 will be seen as a faint patch which looks like an apple core about half way inbetween.

Aquila route

Centre the bins onto Altair – the brightest of the head of the Eagle. Looks a lot like the belt of Orion. Move slowly upwards to find the arrow of Sagitta. Move the point of Sagitta to the centre of your field. Then scan slowly north (upwards). On reasonable nights, it should appear.

LL22 Messier 11

LL22 is also known as Messier 11 or the wild duck cluster.

Type of object: Open cluster

Magnitude : 6.3

Where is it? Scutum RA: 18h 51 Dec: -06 16'

Why we like it.

This is one of the richest open clusters visible from the UK and the stars are so tightly packed that in some ways it seems to be more like a globular than an open cluster.

The cluster is though to contain nearly 3000 stars and is estimated to be about 220 million years old. It gets its name from the shape that the cluster seems to resemble through a telescope which is said to be like a flock of flying ducks.

This is an object that although it is visible through binoculars as a hazy patch looks best through a medium to large aperture telescope. It is probably at its best in a telescope of more than 150mm at about x70-x100.

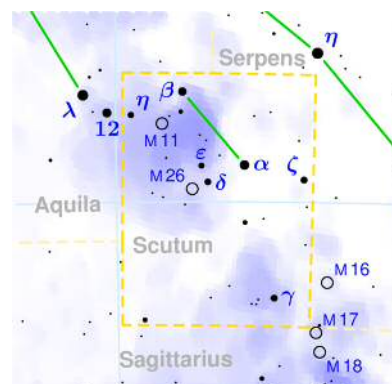
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Just before dawn	Early hours – from midnight	Sunset onwards	Sunset but sets shortly after.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	★
Binoculars	★★
Up to 100mm	★★★
Up to 150mm	★★★★
200mm	★★★★★

Map and pictures



How to find it. Relatively easy to find close to Beta Scutum in a rich part of the Milky Way it still stands out at low power as a misty patch

Map: www.wikimedia.org
Photo: www.wikipedia.org

LL23 The Great Hercules Cluster

LL23 is also known as Messier 13

Type of object: Globular Cluster

Magnitude : 5.8

Where is it? Hercules RA 16:41.7 Dec +36:28

Why we like it.

The Great Hercules Cluster is one of the gems of the northern sky, celebrated and fêted wherever it is seen, and rightly so. Globular clusters can, on occasion, be dense and unyielding giving very little away, but M13 is a generous sort.

When you think you have seen all it has to give, it surprises you, revealing more and more exquisite detail. Under favourable conditions I have seen trails of stars branching out from opposite sides of the cluster, giving it the appearance of having grown a fabulous mustachio.

With larger aperture telescopes you may tease out the infamous 'propeller', a 'Y' shaped region of dust obscuring the stars behind. However you choose to look, it never fails to impress.

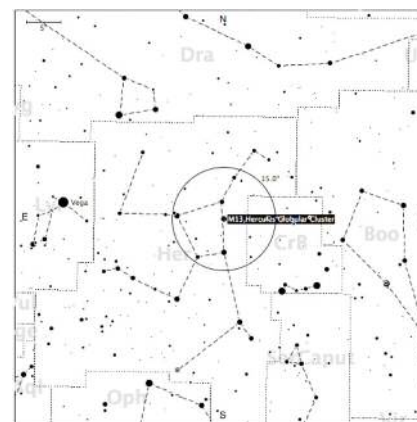
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Midnight to dawn	Dusk to dawn	Dusk to before dawn	Sunset to before midnight

How best to see it.[some objects look better in smaller instruments]

Naked Eye	★
Binoculars	★★★
Up to 100mm	★★★★
Up to 150mm	★★★★
200mm	★★★★

Map and pictures



N.A.Sharp, REU program/NOAO/AURA/NSF (for details see Conditions of Use)



Image – E Sharpe – LAS
Isle of Wight March 2012

How to find it.

- Imagine a line between Vega and Arcturus
- Half way between them are four stars which make a 'keystone' shape
- Point your binoculars halfway between the two western most stars of the keystone.
- Go slightly up and you should come across M13 very quickly.

LL24 The Great Pegasus Cluster

LL24 is also known as Messier 15

Type of object: Globular Cluster

Magnitude : 6.2

Where is it? Pegasus RA 21:30.0 Dec +12:10

Why we like it.

The Great Pegasus Cluster may not often get headline billing, but for sheer spectacle, it is hard to beat. It's as if we have caught a giant cosmic firework, just in the process of exploding in pyrotechnic ecstasy. A tight, bright core, somewhat lop-sided showering the heavens with a scintillating halo of sparks, if you listen carefully you can hear the galactic 'oohs' and 'aahs'. Most globular clusters would be satisfied with such a show, but M15 is not content to merely delight, it wants to challenge too and in amongst its sparkling halo it harbours a planetary nebula. True you are going to need a big scope from a dark sky site and a filter or two, but what a story you'll have to tell.

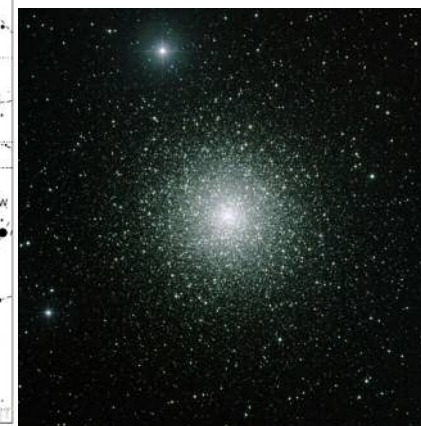
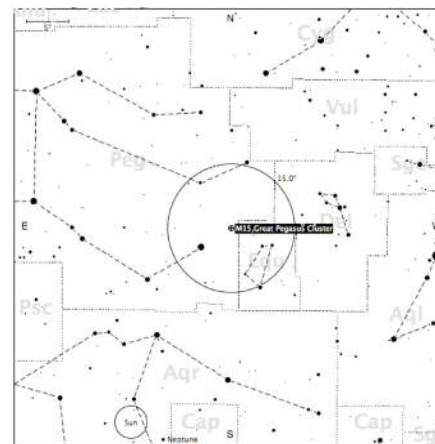
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Not really visible	Midnight to just before dawn	Sunset to sunrise	Sunset to midnight.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	★
Up to 100mm	★★★
Up to 150mm	★★★★
200mm	★★★★

Map and pictures



NOAO/AURA/NSF (for details see Conditions of Use)

How to find it.

- Locate the 'square' of Pegasus
- Identify the brightest and south-western most star of the square, alpha.
- Locate a small kite shape made up of 4 stars, the constellation Delphinus.
- M15 is just over half between alpha Pegasi and Delphinus and a little below

LL25 Messier 51

LL51 is also known as Messier 51 or the Whirlpool Galaxy.

Type of object: Galaxy

Magnitude : 8.4

Where is it? Canes Venatici RA: 13h 29m Dec: +47 11'

Why we like it.

Probably the finest face on spiral galaxies accessible to amateur telescopes in the northern hemisphere.

It was made famous and gets its name from observations made by Lord Rosse in the 19th century who was the first to resolve its spiral structure using the 72inch Leviathan telescope.

Although it can be seen from a dark site with large binoculars (15x70) it is best seen in a large telescope of 8 –10 inches in aperture which will reveal some hints of the spiral and the cores of M51 and its companion galaxy.

Like most galaxies it is badly affected by light pollution and will need a large scope to show it in suburban skies.

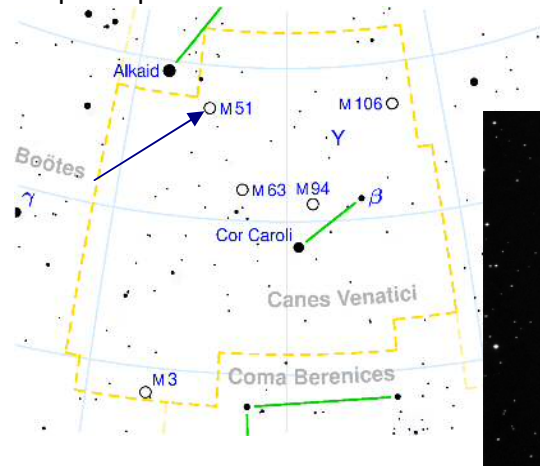
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Evening – early hours	Early hours to dawn	Midnight - Dawn.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	★
Up to 100mm	★★
Up to 150mm	★★★
200mm	★★★★

Map and pictures



How to find it. From a dark site M51 is fairly easy to find about a third of the way between Alkaid at the end of saucepan handle of Ursa Major and Cor Caroli the main star in Canes Venatici.

Map: www.astronomycentral.co.uk

Photos: Steve Richards and Ken Harrison LAS

LL26 M92

LL26 is also known as M92

Type of object: Globular Cluster

Magnitude : 6.0

Where is it? Hercules 17^h 17^m 07.27^s, +43° 08' 11.5"

Why we like it.

The second brightest globular in the northern sky second only to the show piece globular M13 in the same constellation.

Best viewed through a 100mm or greater telescope at about 90X but can be found in bins quite easily and smaller instruments will pick it up.

If you have a pair of wide angle say 7 degrees a good test is to see if you can get both M92 and M13 in the same field of view.

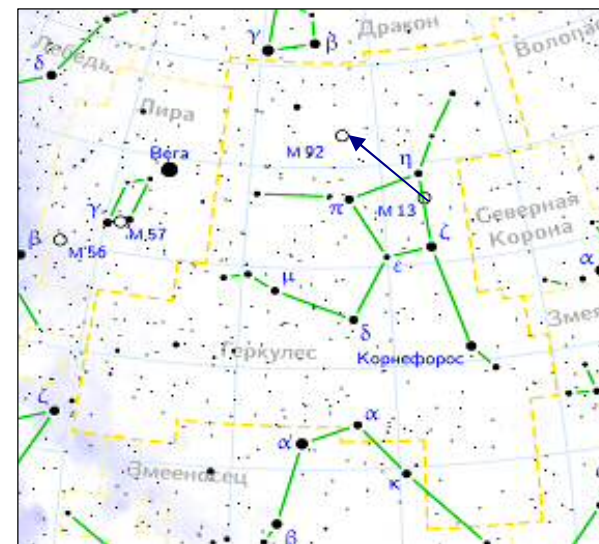
We like it because everyone goes for M13 and forgets about M92, so keep LL 26 in your evening tour. Great for summer and early autumn nights.

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Early hours rising in east before dawn, earlier as the spring draws to a close.	From dusk and high up in the summer sky	From dusk to well after midnight	Sunset onwards low in the west until the onset of winter – use Vega as a guide

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	★ ★
Up to 100mm	★ ★ ★
Up to 150mm	★ ★ ★ ★
200mm	★ ★ ★ ★ ★



How to find it.

Most observers would start with locating M13. (LL23) Make sure you have this in its position between the head stars of the keystone of Hercules.

- Using Bins draft slowly east. If the constellation is rising sweep downwards, if setting, go upwards a bit.
- There are no bright stars nearby so you need to practice but on a good evening it will stand out. Similar to M13 in bins or a small scope. It forms a triangle with η and π of the keystone.

LL27 The Eagle Nebula

LL27 is also known as Messier 16/NGC6611.

Type of object: Open Star Cluster/Nebula

Magnitude : 6.0

Where is it? Serpens RA 18:18.8 Dec -13:47

Why we like it.

Describing the Eagle Nebula as an open cluster (M16) embedded within a diffuse emission nebula (IC4703) does not do it justice. We are actually watching the 'primordial' dust and gas collapsing to form hot, young stars, which in turn 'light up' the nebula. The nebula itself is still giving birth to new stars, as shown in the stunning Hubble image of the Pillars of Creation.

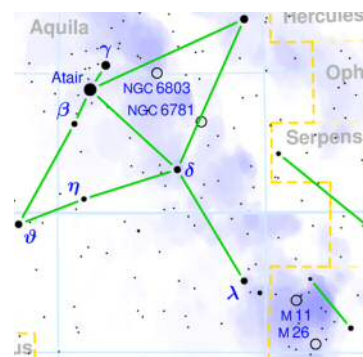
Some observers see the nebula as an eagle with out-stretched wings, others see the eagle within the dark dust clouds of the nebula - wherever you see it, you are best off using a low power. The cluster itself is much easier to spot, how many of the 60 or so stars can you make out. Larger aperture telescopes and perhaps an O-III filter will reveal more structure in the nebula. An object not to be missed. Looking at the map you can also try some other objects nearby. These are not on the current LL list but well worth a visit if you have a good southern horizon.

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Out of view	Rising in the east and then through the night	After sunset to late at night.	Just after sunset but out of view by late autumn

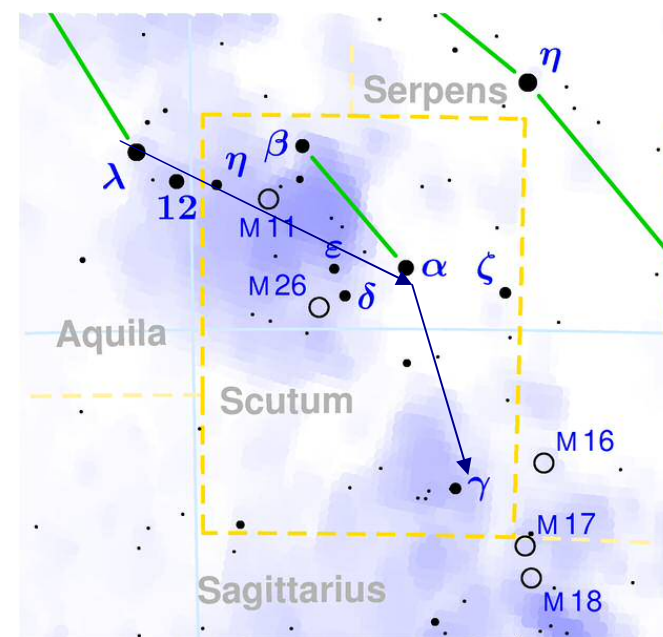
How best to see it. [some objects look better in smaller instruments]

Naked Eye	
Binoculars	★★
Up to 100mm	★★★★
Up to 150mm	★★★★
200mm	★★★★★



How to find it.

- Find the constellation of Aquila
- Follow the stars down the eagle's back to Lambda
- Now continue the line through to Alpha Scuti
- And then southwards towards Gamma Scuti
- Aim your binoculars or image correct finderscope at Gamma and put it in the 7:00 position. M16 or LL 27 will be on the right of the field.



If you can't quite find it, place Gamma in your field of view and do a slow spiral search and you will find it very easily.

LL28 M 10

LL28 is also known as Messier 10/NGC6254

Type of object: Globular Cluster

Magnitude : 6.6

Where is it? Ophiuchus RA 16:57.1 Dec -04:06

Why we like it.

M10 is one of the larger, brighter globular clusters in the constellation Ophiuchus. M12 another globular cluster is nearby.

It has a compressed bright core easily seen as a faint smudge, even in smaller telescopes. Increasing the aperture and power stars begin to be resolved.

At a dark sky site you will be rewarded with a spectacular globular cluster. Some observers report that it appears 'pear-shaped' or elongated, with large telescopes it's possible to discern two 'spiral arms'.

M12 is nearby as is M14, another globular in this region.

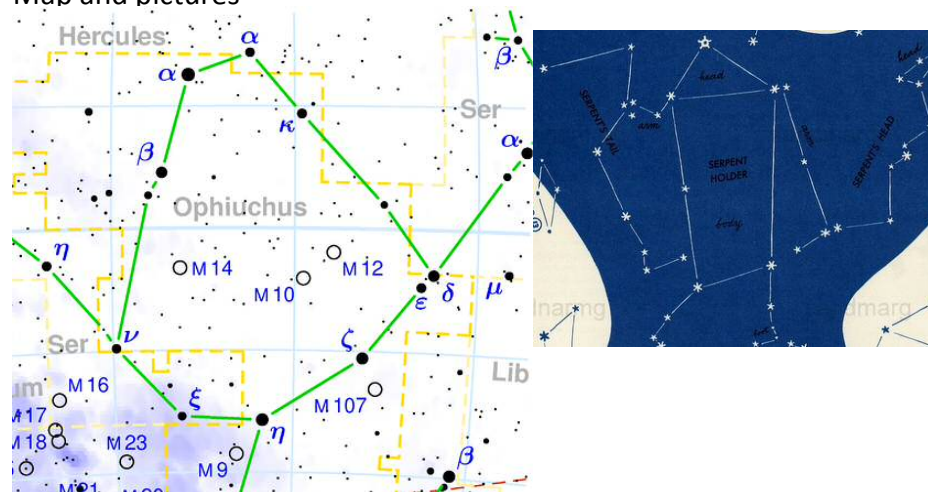
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Just before sunrise	From midnight to sunrise	After sunset to the small hours	Just after sunset, but low in the west.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	***
Up to 100mm	*****
Up to 150mm	*****
200mm	*****

Map and pictures



How to find it.

- In binoculars, M10 is a same-field binocular pair with globular cluster M12 located about half a fist width west of Beta Ophiuchi
- M10 is the southernmost of this pair and will appear brighter.
- Identify Beta Scorpii as your first starhop marker.
- Slightly more than a fist width north, you will see the twin Yed stars (Delta and Epsilon).



- To the northeast are another close, bright pairing – Beta and Gamma Ophiuchi.
- M10 and M12 are about 1/3 the distance between the twin Yeds and the Beta/Gamma pair. Both are bright enough to be seen as a small, fuzzy patch in the finderscope.

LL29 M12

LL29 is also known as Messier 12/NGC6218

Type of object: Globular Cluster

Magnitude : 6.7

Where is it? Ophiuchus and RA 16:47.2 Dec -01:57

Why we like it.

M12 can be seen in the same binocular field of view as another globular cluster, M10. But M12 is very different, it has had a very tough life, it has, literally, been beaten up by the Milky Way.

As it orbits it passes through dense regions of the galactic plane and it is estimated that a million stars have been untimely ripped from the cluster.

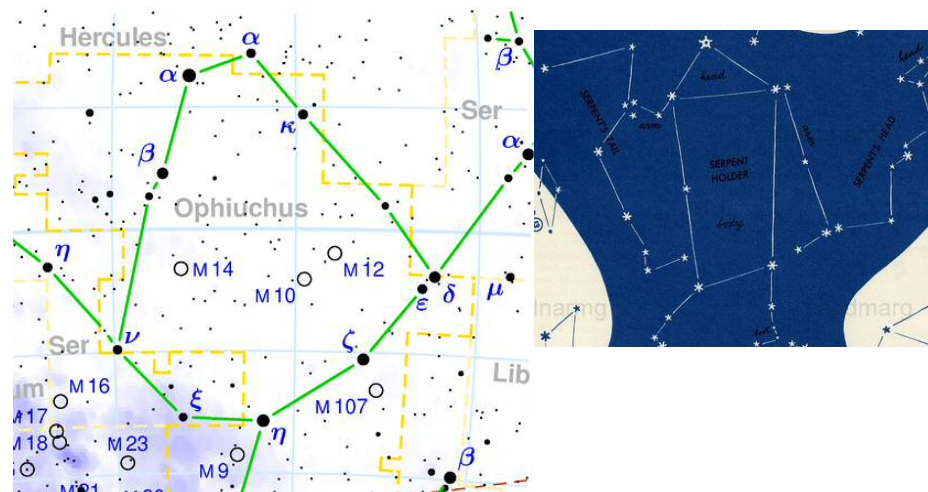
At this rate M12 has only another 4.5 billion years, which in globular cluster terms is not very long, so catch it while you can. M12 appears looser and brighter than M10 and at higher powers starts to resolve.

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Just before sunrise	From midnight to sunrise	After sunset to the small hours	Just after sunset, but low in the west.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	★
Up to 100mm	★★★★
Up to 150mm	★★★★★
200mm	★★★★★



How to find it.

- In binoculars, M10 is a same-field binocular pair with globular cluster M12 located about half a fist width west of Beta Ophiuchi
- M10 is the southernmost of this pair and will appear brighter.
- Identify Beta Scorpii as your first starhop marker.
- Slightly more than a fist width north, you will see the twin Yed stars (Delta and Epsilon).
- To the northeast are another close, bright pairing – Beta and Gamma Ophiuchi.
- M10 and M12 are about 1/3 the distance between the twin Yeds and the Beta/Gamma pair. Both are bright enough to be seen as a small, fuzzy patch in the finderscope.



LL30 Sagittarius Star Cloud

LL30 is also known as Messier 24/IC4715
 Type of object: Star Cloud

Magnitude : 4.6
 Where is it? Sagittarius RA 18: 16.9 Dec -18:29

Why we like it.

The Sagittarius Star Cloud is a spectacular sight, unfortunately it never appears high above the southern horizon from Loughton and as such is in our Gold section of the list.

Though not to have included it, would have been remiss of us. It is the original 'something for everyone', from naked eye observers, through dyed in the wool binocular observers to owners of the largest motorised dobsonians.

It has an embarrassing abundance of riches, just lie back and take in the grandeur of the thousands of stars. Feeling overwhelmed, then increase the power and explore the myriad of objects within it, from tiny open clusters to dark nebulae to emission nebulae to planetary nebula. If you tire of M24 you tire of life.

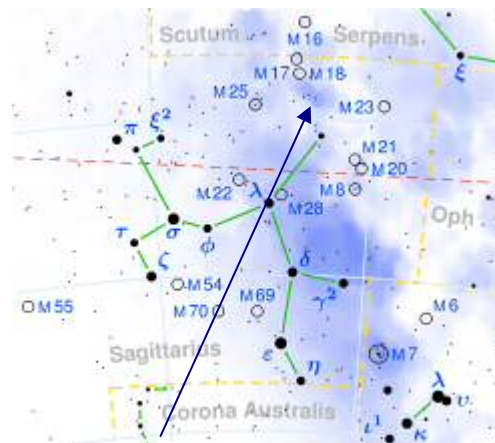
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Just before sunrise but rather low in the south	Rises after midnight to sunrise	Rises after sunset, set in the hours before midnight	Not visible.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	**
Binoculars	****
Up to 100mm	****
Up to 150mm	****
200mm	****

Map and pictures



How to find it.

From a dark sky site M24 is easy to find with the naked eye, a large fuzzy patch about a hand span above the teapot asterism. Even from urban skies, binoculars will easily reveal this massive cloud of stars. With more power you'll only be able to study small part of cloud at a time. Just locate the Sagittarius constellation area and move slowly north (up) in the direction of Aquilla.

Another way is to locate the general area between M25, M17, M18 and M23. M24 is in the middle.

From suburban skies it is a challenge but use low power wide field binoculars if you have a reasonable southern horizon. If there is notable light pollution save this for a better site.



LL31 [M33]

LL31 is also known as Messier 33 – The Triangulum galaxy.

Type of object: Nebula

Magnitude : 6.0

Where is it? Triangulum – 01h 33.9m 30deg 39m Dec

Why we like it.

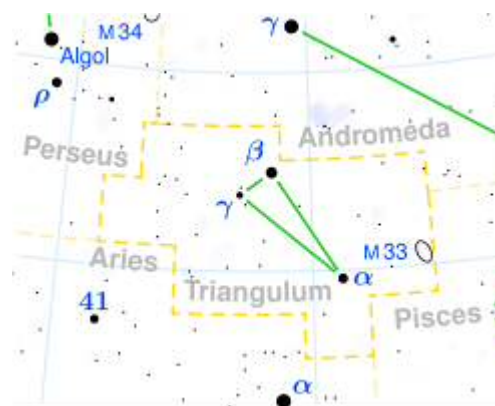
We concede that there are some objects not in the current list that are a lot easier than M33. Infact from suburban skies, its difficult to find at all, but we have put it in as one to keep back for those nights where it is really clear, dark and its “worth a go”. In bins it’s a soft cotton wool glow, drifting silently in the autumn and winter sky. As a member of our local group, M33 is quite a size but because it is face on, its light is spread out and so much harder to see than its magnitude suggests. Small bins will struggle, anything below 50mm unless of a high quality optics may not show anything. In local skies I have had to revert to my 5inch refractor and even then not seen it. Skies need to be transparent, free of dust and muck, so after a rainstorm may be best. This is probably one of our hardest objects to find in our list. Use a low power for this one.

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening to midnight.	Not visible	View from late night time in the summer	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	★
Up to 100mm	★★★
Up to 150mm	★★★★
200mm	★★★★★



How to find it.

Find Perseus and the star Algol (LL40). Draw a line west to Andromeda and gamma which is also known as Almach.

The Triangle is a faint constellation hanging in the space below the line. Binoculars can pick out the three stars. Select alpha which is at the bottom and narrowest part of the triangle.

Place Alpha to the left of your field of view in your finder scope and move slowly westwards.

Sometimes M33 pops out by tapping your telescope tube slightly or looking with averted vision. Be patient. If you can't see it, wait for better skies or a star party where you can use a larger scope.

It has low surface brightness which is spread over the object making it a challenge to see in suburban skies

LL32 The Cheshire Cat

LL32 is also known as Cheshire cat
 Type of object: Asterism
 Magnitude : 5-7
 Where is it? In the constellation of Auriga

Why we like it.

This can take more than one look! During an observing session, one of our authors was looking right at it but still could not see it. You almost need to step back a bit and look over a fairly wide field

The Cheshire cat looks like the cat out of Alice in wonderland. With the two eyes and the smiley face ! This quite a difficult asterism to pick out as the other LL objects in Auriga tend to hog the limelight.

Look for two stars that mark the eyes and the smile is formed by a sweep of stars shown in our diagram.

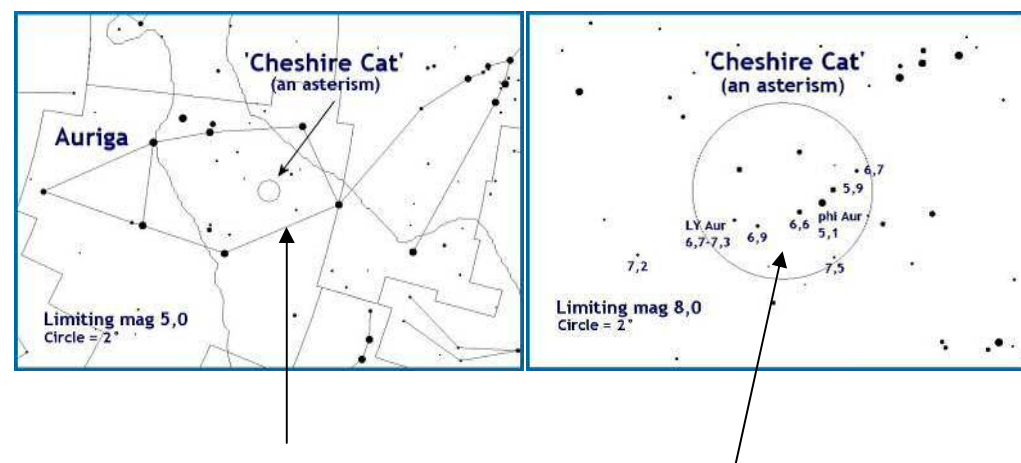
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	*** *
Up to 100mm	***
Up to 150mm	***
200mm	***

Map and pictures



How to find it.

Get yourself orientated on Auriga. The map above is another version of maps in this guide for the constellation. Its easiest to start from the left hand (or eastern) side of the constellation in the area where Messier 37 and 36 are. Look at LL4 and LL10 for guidance if you need to first of all. Once you have M37 and M36 you can sweep into M38 which is almost central in the constellation. The cat is just to the right of M38.

Located SSW of the Messier object M38 and can be found by using low power binoculars.

LL33 M39

LL33 is also known as Messier 39/NGC7092

Type of object: Open Cluster

Magnitude : 4.6

Where is it? Cygnus RA 21:32.2 Dec +48:26

Why we like it.

M39 is a much underrated and an often over-looked open cluster.

It really is a case of location, location, location!

It finds itself in a wonderful neighbourhood, set against a rich star field the 30 or so stars form a 'V' in the sky much like a formation of geese on migration.

What is particularly lovely is the contrast of the uniformity of the stars within the cluster and the chaos of the stars in the background. Spend time with this cluster and you will be amply rewarded.

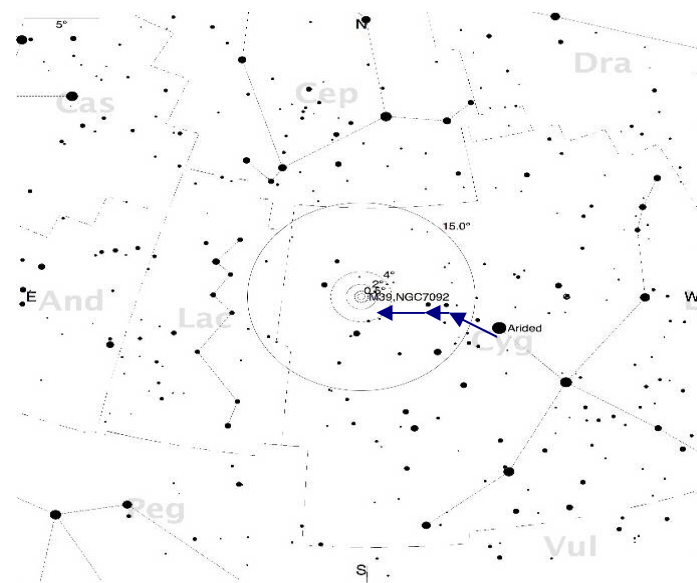
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
After sunset, sinking low to the north by midnight	Rising in the north east before midnight	Overhead at midnight	High in the west at sunset to low in the NW in the small hours.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	★
Binoculars	★★★
Up to 100mm	★★★★
Up to 150mm	★★★★★
200mm	★★★★★

Map and pictures



How to find it

- Find the constellation of Cygnus
- Pinpoint its brightest, northernmost star Deneb and aim your binoculars there.
- M39 about a fist width east and a bit north of Deneb (Alpha Cygni).
- There is a small trail of stars that arc over towards M39. You may need to practice this a bit as M39 is quite some way from Deneb.
- It will show easily in the telescope finderscope as a hazy patch and even begin resolution with larger aperture finders.
- As always low power is the key to observing open clusters.



LL34 Messier 65/66

LL34 is also known as Messier 65/66

Type of object: Pair of Galaxies

Magnitude : M65 – 10.3, M66 – 9.7

Where is it? Leo RA: 11h 17m Dec: +13 25'

Why we like it.

An attractive pair of spiral galaxies which are well seen from a dark site in a low power view with telescopes above 80-100mm in aperture.

The galaxies along with NGC 3628 form the famous Leo Triplet which is a popular target for astro-imagers and deep sky observers.

The galaxies are thought to be about 35 million light years away. Both of them were discovered by Charles Messier in 1780.

Like most galaxies M65/66 are affected by light pollution and will need a scope to show them in suburban skies.

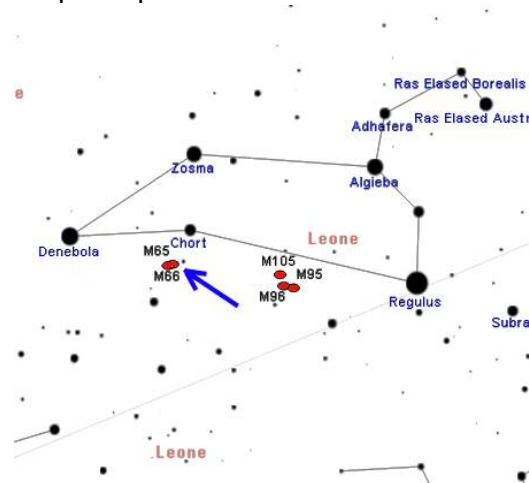
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Late Evening - end of night	Dusk until early hours	Not visible	Just before dawn

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	★
Up to 100mm	★★
Up to 150mm	★★★
200mm	★★★★

Map and pictures



How to find it. M65/M66 are fairly easy to find tucked just below Denebola (Beta Leo) and Theta Leo.

Map: www.wikimedia.org

Photo: Elliss Sharpe LAS Isle of Wight March 2012

LL35 M71

LL35 is also known as Messier 71/NGC6838

Type of object: Globular Cluster

Magnitude : 8.2

Where is it? Sagitta RA 19:53.8 Dec +18:47

Why we like it.

M71 is one of those oddballs that has defied classification, too tight to be an open cluster and too loose for a globular cluster. Only very recently has it finally been classified as a globular cluster.

Despite it being a loose globular it requires higher power and larger aperture to begin to resolve it and as such it is in our Gold section of the list.

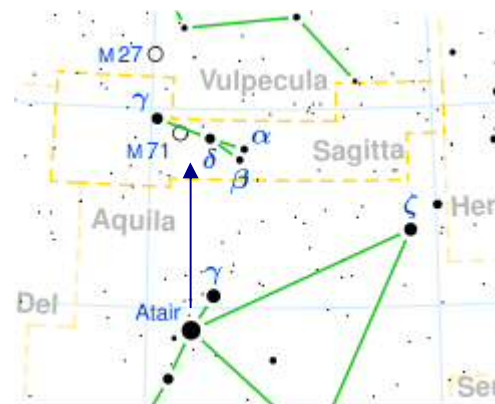
Don't let that put you off, spend some time getting to know it, okay it may not be as spectacular as M13 nor perhaps as pretty as M92 but it does have a great personality. It really does reward the extra effort you've put in, the more you look the more it reveals of itself and before you know it will have become one of your favourites.

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Rises in the small hours before sunrise	High in the south east at midnight	From sunset to just before sunrise	Sunset to before midnight.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	★
Up to 100mm	★★★★
Up to 150mm	★★★★
200mm	★★★★★



How to find it

Relatively easy to find

- Find the arrow shape of Sagitta north (up) from Altair in Aquila.
- Just use the chart and look for the 6th magnitude star about halfway between Gamma and Delta Sagittae.

LL36 Bode's Galaxy & Cigar Galaxy

LL36 is also known as M81 & M82/NGC3031 & 3034

Type of object: Galaxies

Magnitude : 6.9 & 8.4

Where is it? Ursa Major RA 09:55.6 Dec +69:04

Why we like it.

These two galaxies form one of the finest views in the whole sky. Individually they would be worth the price of admission, together they are simply spectacular.

A cosmic dance of epic proportions, one a perfect spiral, the other a broken, disfigured brute. They are the Beauty and the Beast of galaxies.

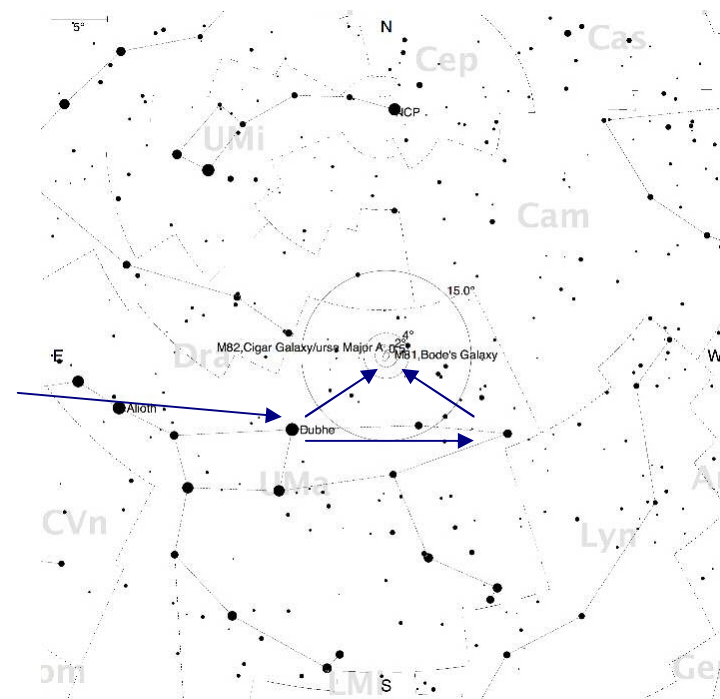
Have we overstated it, perhaps, but consider M81 is one of the nearest and brightest spiral galaxies and M82 crackles and fizzes with radio and infrared radiation, there is plenty to delight the observer. Even a small telescope will start to reveal some structure and increasing the aperture can only increase the pleasure.

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Dusk to dawn	Dusk to dawn	Dusk to dawn	Dusk to dawn though lower in the sky

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	★ ★
Up to 100mm	★ ★ ★ ★
Up to 150mm	★ ★ ★ ★
200mm	★ ★ ★ ★ ★



How to find it.

- By using the lower star closest to the “handle” in the bowl of the plough, draw a line between it and Alpha – the top outside star of the asterism.
- Now extend that line another 1/3 of it's length and you'll have the approximate area.
- Once you are there, both M81 and companion galaxy M82 are easy to spot in a finderscope or small binoculars.

Image by Elliss Sharpe Isle of Wight 2012



LL37 Smoking Gun or Virgo A

LL37 is also known as M87/NGC4486
Type of object: Elliptical Galaxy

Magnitude : 8.6
Where is it? Virgo RA 12:30.8 Dec +12:24

Why we like it.

How often in life can you say you're looking at a super-giant elliptical galaxy that thinks it's a galactic super-volcano erupting from the super-massive black hole at it's core?

Admit it, not often enough, but with M87 you can.

Although this is definitely in the Gold section of our list, it's not too difficult to find.

In a pair of 9x63 binoculars it should be easily visible as a faint fuzzy splotch, M84 & M86 should be visible in the same field of view. In a telescope it will appear as an unresolved globular cluster, but at a dark sky site and with a large dobsonian it may be possible to make out the jet of matter spewing from this awesome galaxy. It will be one of the coolest, freakiest objects you will ever see.

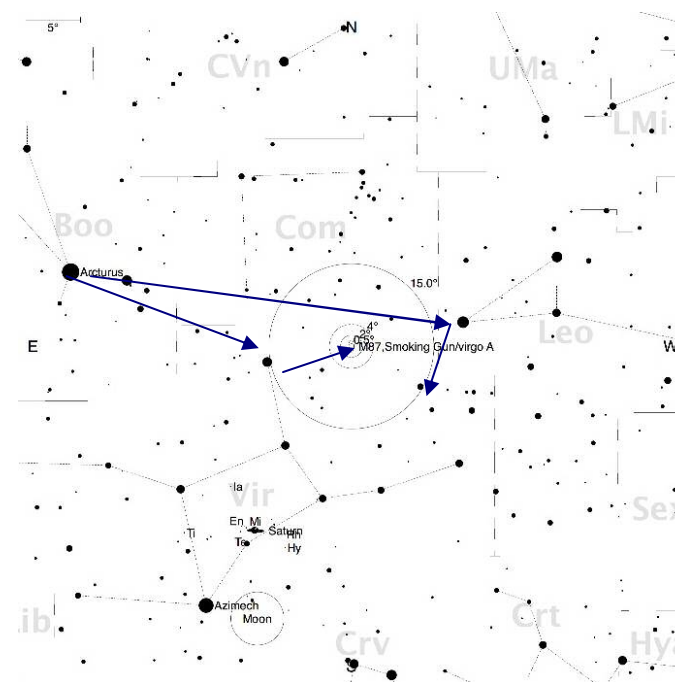
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
From midnight to dawn	After dusk or just before dawn	Sets shortly after dusk	Not visible

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	★
Up to 100mm	★★★★
Up to 150mm	★★★★
200mm	★★★★

Map and pictures



How to find it.

- Find Arcturus in the constellation of Boötes and Denebola in the constellation Leo and describe a line between them.
- Half way along and just south of that line, just before you get to the tail of Leo you will find the pair of galaxies M84 & M86.
- Move slowly east/southeast until you come across the next bright 'egg shaped' galaxy. In larger telescopes you'll pass lots of smaller galaxies, M87 will be obviously brighter than the others. In a small telescope M87 will be about the only one you can see.



LL38 [M57 – the Ring Nebula]

LL32 is also known as M57 – The Ring Nebula

Type of object: Nebula

Magnitude : 8

Where is it? In the constellation of Lyra

Why we like it.

Located in the constellation of Lyra. This is the remnant of a supernova - the death throes of a star. The ring is material that was ejected from the explosion and spread into space across its system.

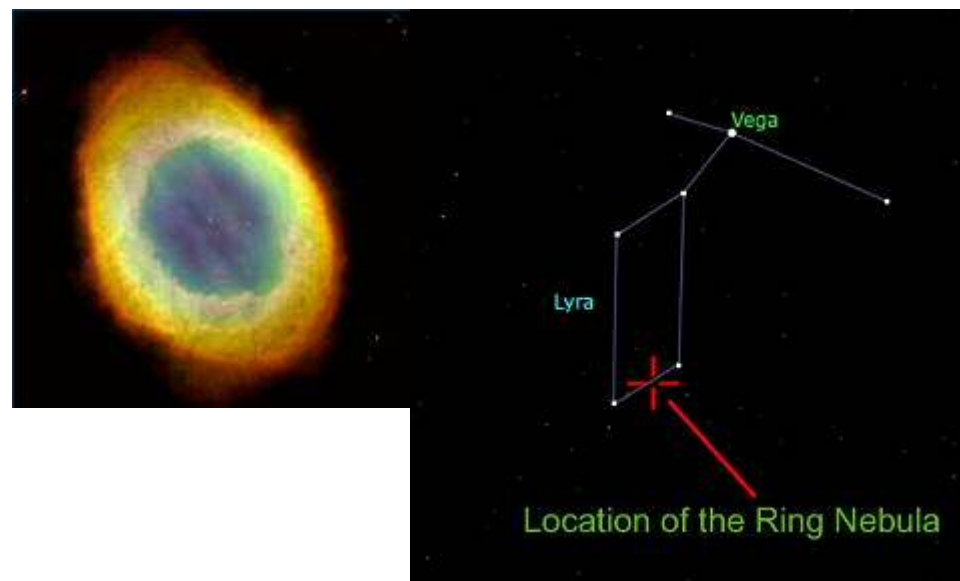
From the relative safety of Earth view shows a dusky smoke ring hovering among the edges of the milky way. Almost ghost like LL38 is a must see but you will need a bit more than a pair of bins unless you have a large pair. The ring nebula requires at least a 4 inch 100mm telescope to be seen well. Low power will pick it up, but 80-90X will show some structure. This is one for you to view using other members scopes as well. As you move up the size range, this object becomes more impressive and a reminder of the awesome power and energy of a star. Our life givers also take away.

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Dawn and then early hours low in North.	From dusk and well into the night and dawn	Overhead and into the west .	Sunset onwards but getting lower in the west.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	★ ★
Up to 100mm	★ ★ ★
Up to 150mm	★ ★ ★ ★
200mm	★ ★ ★ ★



Map and pictures

How to find it.

Best to start with the Vega in the Summer Triangle. Most atlases will have this as a beginner item.

The triangle's brightest star is Vega which is only 20 or so light years away. From Vega there is a group of fainter stars forming a slanted box. Select the "bottom two".

Draw an imaginary line between them. LL32 is placed roughly halfway but "below" the line. A low power eyepiece in your scope should help locate. A finder can help position you in the approximate area but won't show the object itself. Between the two stars the ring is located between them.

LL39 Garnet Star

LLn is also known as Mu Cephei
Type of object: Variable star

Magnitude : 3.4 – 5.1
Where is it? Bottom of Cepheus

Why we like it.

Herschel was a prolific observer and one of the most famous of 19th century astronomers. His sister and son also contributed significantly. Mu Cephei is a large orange/red giant star X light years away. It is huge – about 2.4 billion miles in diameter and would reach Jupiters orbit if it sat where our sun is. It is also variable and so at its lower levels may not be visible to the naked eye from Loughton.

Its colour is striking and being circumpolar is visible most of the year. Late summer to autumn is best for evening observers as it rises in the north east. It is also an object to target in the spring evenings as Cepheus descends towards the north west.

Good star atlases will show Struve 2816 and 2819 nearby which are a double and triple star system respectively. According to French both are splitable in small scopes at powers over 50x.

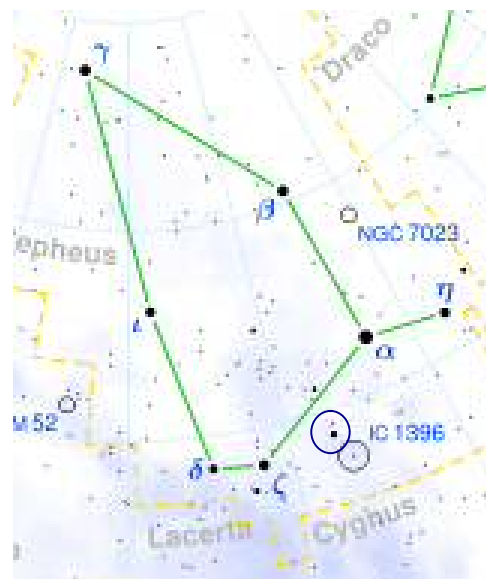
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
All night – high in south and west	Lower in west at dusk, rising in east towards dawn and earlier in night	Dusk onwards in east and rising	All night – high up in south/overhead.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	★ ★
Binoculars	★ ★ ★
Up to 100mm	★ ★ ★ ★
Up to 150mm	★ ★ ★ ★
200mm	★ ★ ★ ★

Map and pictures



How to find it.

- Cepheus is best described as a house drawn by a child.
- Alpha Cephei is on the bottom right.
- Draw a line from alpha across to Delta. Starting from delta move about 2 degrees right and down slightly to zeta.
- Place zeta to the left of your binocular view and Mu should appear on the right handside.
- Alternatively try starting at Alpha – move along the line to delta about 30% of the way to Nu. Mu should be towards the bottom of the field of view in binoculars.

LL40 Algol

LL40 is also known as Beta Persei/The Demon Star

Type of object: Eclipsing Binary Variable Star

Magnitude : Naked Eye 2.1 – 3.4

Where is it? Perseus
RA 03h 08m 10s Dec +40.95

Why we like it.

Do you have what it takes to stare into the eye of the Medusa and not blink first?

Algol, the Demon Star is in the constellation of Perseus and is said to represent the head of the Medusa that Perseus used to destroy the sea monster Cetus and save the beautiful Andromeda. Algol is the most well known eclipsing binary and every 3 days (actually 2 days 20 hours and 49 minutes) it dims to only a third of it's normal brightness. What we are seeing is one of the most incredible sights in the heavens, as one star partially eclipses another and then in a matter of hours Algol returns to normal.

Do you still think Medusa will blink first? Maybe not, but it'll be fun trying.

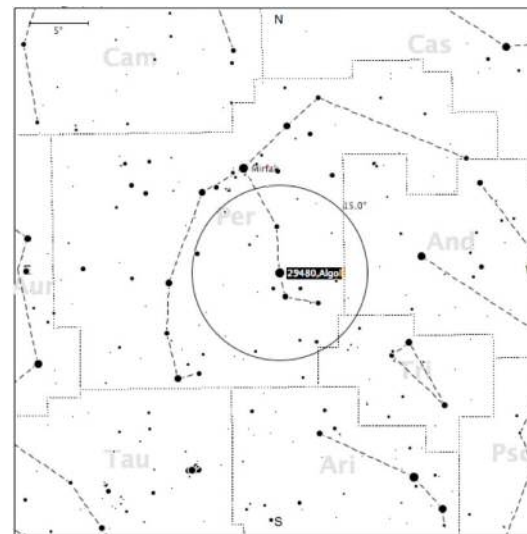
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
After sunset to after midnight	Just after sunset, May and June difficult to see	Rises after sunset to dawn	Sunset to dawn.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	***
Binoculars	***
Up to 100mm	***
Up to 150mm	***
200mm	***

Map



How to find it.

Algol is the second brightest star in Perseus and marks his knee.

Its on the west (right) side of the constellation and easy to find usually in the North east in autumn and overhead in early winter. The Loughton List test is can you track its change in brightness over its period?

LL41 M41

LLn is also known as Messier 41.
Type of object: Cluster

Magnitude : 4.5
Where is it? Canis Major

Why we like it.

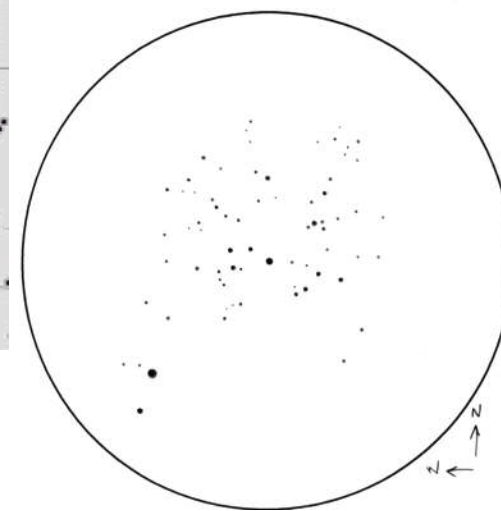
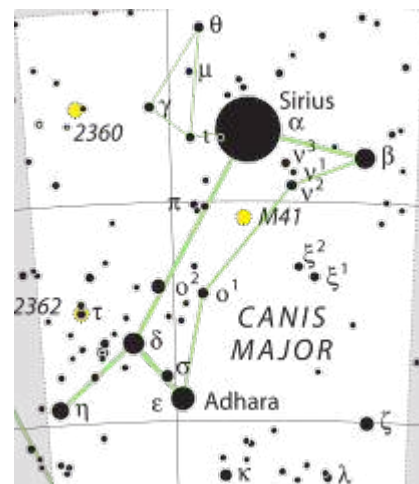
We had some debate about this one. Its low in the winter sky and technically misses our basic criteria for objects visible from the skies of Loughton. However, some members have access to good southern horizons, so it gets gold status. If you get a chance to go abroad in the winter to southerly climbs, it will be at a higher altitude. M41 is pretty. It has less distinctive shape compared to M44 but some observers see lines of stars radiating from out of the the centre. There is some mix of colours but difficult to discern at low altitudes in the Loughton murk. x25 will pick up the brightest stars while x50 should show much more of the background. The whole Canis Major/Puppis area is rich in clusters. A good star atlas will list many of these including non LL targets such as M46, M47, M93, Collander 121, 132 and 140. These are for more practised observers but well within the capabilities of less experienced observers with a good map, bins or a small 80mm scope. Oh and those all important good southern horizons!

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Low in southern sky	Look for something else	Catch east just before dawn	Late evenings in autumn, dusk by December

How best to see it.[some objects look better in smaller instruments]

Naked Eye	**
Binoculars	***
Up to 100mm	****
Up to 150mm	****
200mm	****



The sketch is from the internet.

<http://www.kolumbus.fi/jaakko.saloranta/Deepsky/Messier/M41a.gif>

Using a 3 inch Konus refractor at x 32 in Finland

How to find it.

Find Sirius and centre your bins on it.

Then move Sirius to the top of the field and M41 should appear “due south” at the bottom of the field.

You may need to look a bit harder than these instructions suggest when looking through the atmospheric haze of the low Loughton vista!

LL42 IC4665

LL42 is also known as: IC 4665 Summer Beehive Cluster.
 Type of object: Open cluster.
 Magnitude : Binocular object.
 Where is it? Ophiuchus
 RA 17h 46.2m Dec +05° 43"

Why we like it.

This is often overlooked because its not in the NGC or Messier catalogues. IC 4665 is really pretty and can be picked up in the east from April or May onwards right through to September in the west. It sits near the shoulder of the serpent bearer, Ophiucus.

Quite open, it is also a target for sketching being made up of about a dozen bright stars. It sails nonchalantly across the sky and is one of our first targets in the evening.

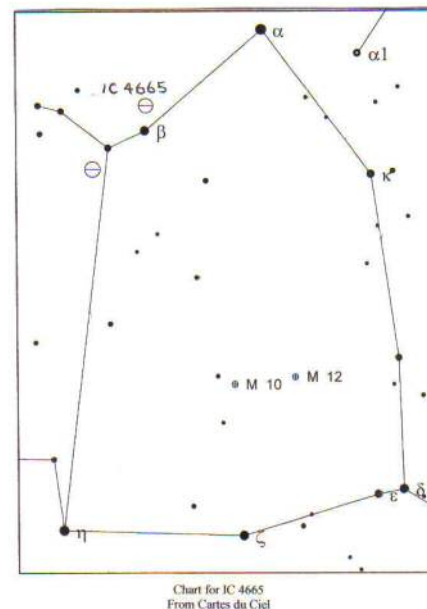
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Just before dawn	Visible all night	In SW around midnight	Below horizon.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	**
Binoculars	****
Up to 100mm	****
Up to 150mm	***
200mm	***

Map and pictures



How to find it.

- This will be in the same field of view as beta Oph. In a small telescope or binoculars.
- At the top of Ophiuchus is a bright triangle which forms the head and shoulders. Select Beta in your bins or finder scope,
- Move beta to the bottom half of the field and LL 42 will move into view.

LL43 NGC 1647

LL43 is also known as NGC 1647
Type of object: Open Cluster

Magnitude : 6.4
Where is it? Taurus 4h 45.9 19 deg 08 N

Why we like it.

This is a squarish cluster not far from Alderbaran and the Hyades (LL3) in Taurus the bull. Looks a bit like the beehive (M44, LL17) to me but with a bit less structure.

Its a good target for sketching and a nice alternative to hunt down between the more famous objects in this area.

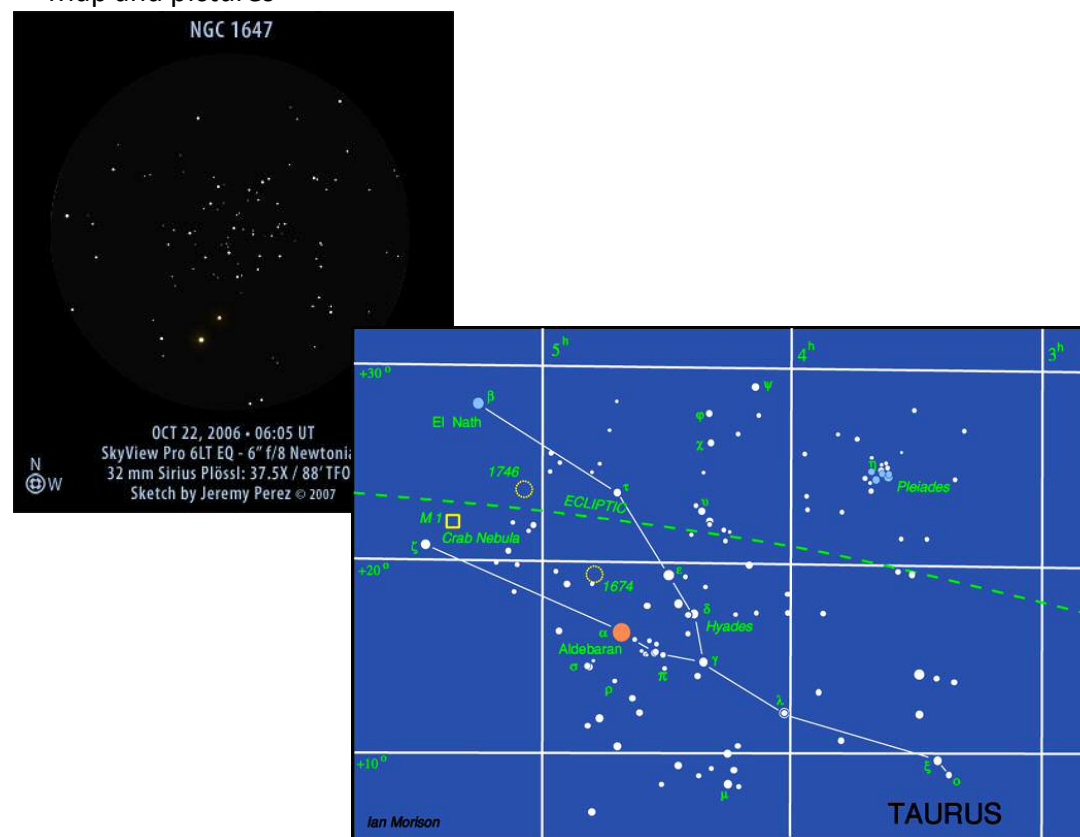
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	**
Binoculars	***
Up to 100mm	****
Up to 150mm	****
200mm	****

Map and pictures



Source: Ian Morison

<http://uk.images.search.yahoo.com/images/view?>

Sketch – J Perez

How to find it.

- Find Aldebaran
- Move 3 degrees to the north east and it should appear in view.
- NB – the map has an error, the label says 1674! But the position is right for NGC 1647 or LL43

LL44 The Engagement Ring

LLn is also known as Polaris and nearby stars
 Type of object: Asterism

Magnitude : Various 5th and 6th plus Polaris (2.0)
 Where is it? Around the north star in Ursa Minor.

Why we like it.

Cheeky arrangement of stars that require a bit of imagination but can prove really useful for aligning equatorial and GOTO scopes. In any small instrument, polaris forms the diamond in a circlet of faint stars that form a slightly knocked about ring.

All you need is a steady pair of bins or a scope at below x30. The value of the ring is that it can help estimate the location of true north in your scope.

As the map shows, if you align your scope on polaris and then move it to a point a similar distance to the edge of the ring but *in the other direction* you will be well enough aligned for most GOTO scope systems set up for a nights visual observation!

The ring is 0.67 degrees across.

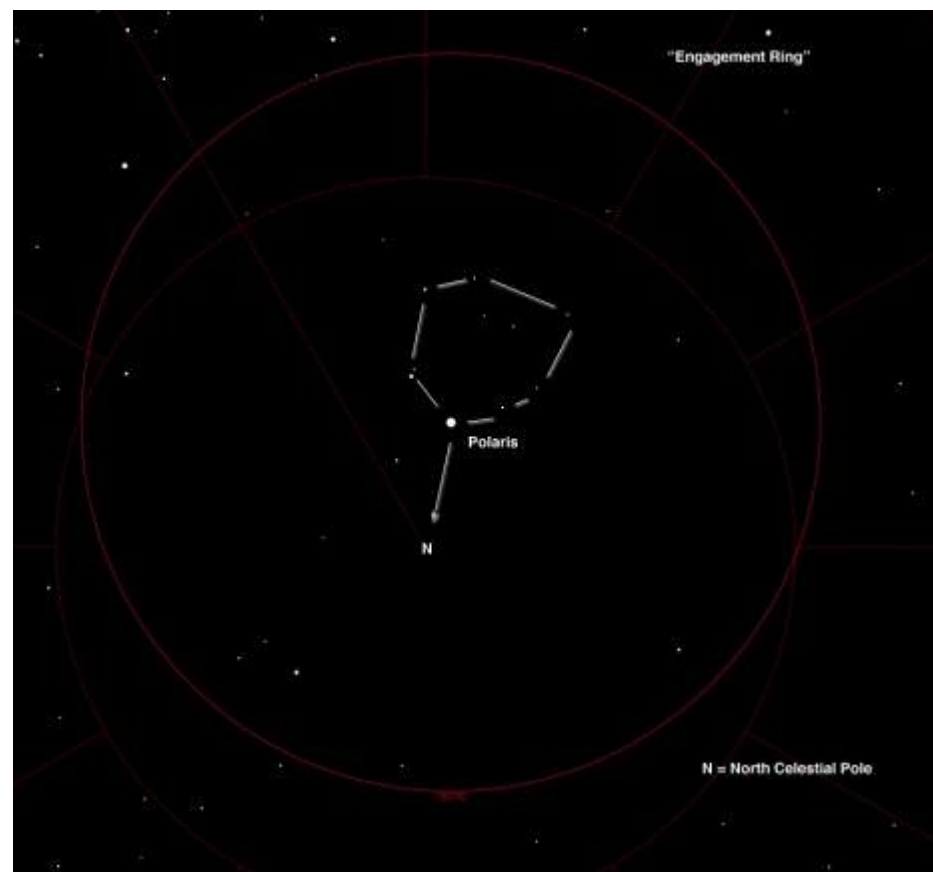
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
All night	All night	All night	All night.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	★
Binoculars	★★★
Up to 100mm	★★★★
Up to 150mm	★★★
200mm	★★★

Map and pictures



<http://astrojourney.wordpress.com/2010/12/24/look-north-in-january-an-engagement-ring-points-the-way-and-w-becomes-an-m/>

How to find it.

Er... using the plough find Polaris. Point and shoot.

LL45 Izar

LLn is also known as Izar – Epsilon Bootis
 Type of object: Double Star

Magnitude : Naked Eye 2.4, 4.8
 Where is it? Bootes the Herdsman

Why we like it.

Izar is an evocative name, meaning Veil. Drifting high in the spring skies, Izar follows Arcturus as a herald of warmer observing times to come! Naked eye it looks like any normal star but don't tick it off your list just yet. A telescope at about x100 or more is needed to split Izar but its well worth it.

See which of your eyepiece and barlow combinations provide the best view. Sue French writes that she normally sees orange and white but that others have have seen blue green or even purple! I have yet to see these colours but have picked up the orange in good skies. Izar is near to LL62 and LL63 Kappa and Iota Bootis, other double stars in this enjoyable part of the northern sky.

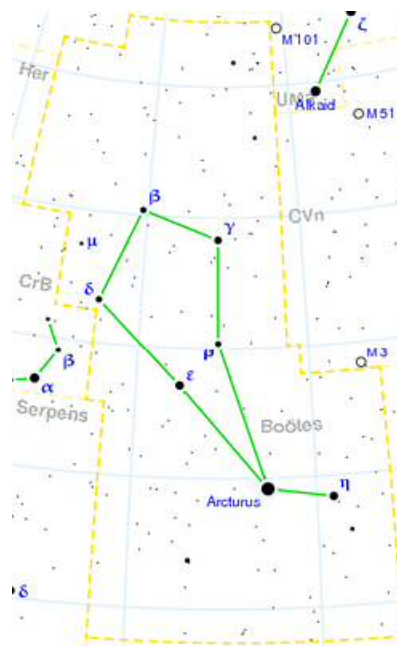
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Before dawn low in east	Dusk through the night	Dusk to midnight	Early evening only.

How best to see it.[some objects look better in smaller instruments]

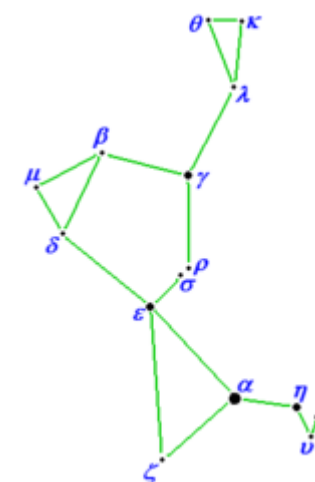
Naked Eye	★ ★
Binoculars	★ ★
Up to 100mm	★ ★ ★ ★
Up to 150mm	★ ★ ★ ★
200mm	★ ★ ★ ★

Map and pictures



Look at the constellation above.

- Izar makes the top of the herdsman's body in a triangle formed with Arcturus and Zeta. Point your scope at Arcturus and ensure it is also in your finderscope as close to the centre as possible.
- Then gradually move to the left and up slightly to about 10 o'clock and Izar will appear in your field. Its about two finderscope fields of view away.
- To the left of Izar is a pretty smattering of 6th and 7th magnitude stars. A good time to practise is around March when Bootes is low in the east at dusk and Izar is not too high. Or, try late summer as Bootes sets towards the west.



LL46 Iota Cancri

LL46 is also known as Iota Cancri.
Type of object: Double Star

Magnitude : 4.0, 6.6
Where is it? Top claw of cancer the crab.

Why we like it.

Cancer is difficult to see in suburban skies despite its main stars being naked eye. As the map shows, the body is an off centre square and two stars mark the top and bottom claws. Iota is a lovely double due to its yellow and bluish pairing.

Other objects in this area are M44 (LL17) and M67 (LL47), gamma and delta Cancri which frame M44 are also double stars. On a late winters night, Cancer presents a tour from Iota, down to gamma, M44, Delta and finally M67 not far from Acubens or Alpha.

Gamma and Delta are also known as Asellus Borealis and Asellus Australis respectively. Delta lies on the ecliptic, the centre of the path that the moon and planets move along and is sometimes eclipsed by the moon.
Enjoy the Iota to Acubens celestial bus ride!

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - to end of night	Dusk only	Rising in early hours low in east	Early hours.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	★
Binoculars	★★
Up to 100mm	★★★★
Up to 150mm	★★★★
200mm	★★★★

Map and pictures



How to find it.

Locate Cancer from Gemini.

In Loughton skies this may not be obvious straight away.

A pair of wide angled bins at around x7 or x8 are best to pick out the brighter stars of Alpha, Delta, Gamma and then Iota in an upwards curving line.

The directions for LL17 to find M44 can be used here as well.

LL47 M67

LLn is also known as Messier 67.
 Type of object: Cluster
 Magnitude : 6.9
 Where is it? Cancer, bottom claw.

Why we like it.

LL47 is often overlooked. M44 (LL17) gets most of the plaudits. LL47 is old. French writes that its 2.5 billion years which is half the age of our sun.

Compared to objects such as the double cluster (LL5) at 13 million years, M67 is an ancient grouping. It is an interesting cluster to observe. There is no obvious shaping or grouping in a telescope, whereas M44 does. Bins will find it but a telescope is worth training on it at powers of say 40 to 80x.

A 100mm plus scope will bring out the cluster well but its also pleasant in bins or low powers as it has a nuce contrast to nearby Acubens – Alpha Cancri. Tie LL 47 into the Cancer tour from Iota described earlier in LL46.

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	★ ★
Binoculars	★ ★ ★
Up to 100mm	★ ★ ★ ★
Up to 150mm	★ ★ ★ ★
200mm	★ ★ ★ ★

Map and pictures



How to find it.

- Use the directions given for LL46 or LL17 and then follow the tour from delta down to alpha to locate it just west of Alpha.
- With some practice you can sweep up to M44 and down again to M67 with a pair of binoculars!

LL48 Mu Draconis

LL48 is also known as: Alrakis, or Arrakis.

Type of object: Binary Star

Magnitude : Naked Eye 5.7

Where is it? Draco

RA 17h 05.3m Dec +54° 28"

Why we like it.

An evenly matched pair of stars both components are magnitude 5.7 and are about 100Ly away. First seen by W. Herschel in 1779.

This is a close pair just 1.9arcsec apart and naked eye or binoculars will show only a single point.

At 100x in a 4" scope and you should be able to see that there are 2 equally bright stars. At higher magnifications this will be a distinct pair. There is also thought to be a magnitude 13 component.

Period is about 482 years

Arrakis was the home star system in Frank Herbert's Dune.

Quite a challenge and hence on our gold list.

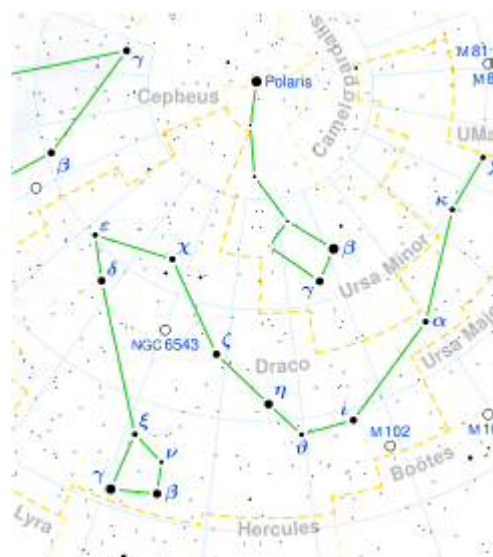
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Jan low in N, better by March	Well up in NE from 11pm	Over head at 11pm	Gets quite low in the North by Dec.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	★
Binoculars	★
Up to 100mm	★★★★
Up to 150mm	★★★★
200mm	★★★

Map and pictures



- **How to find it.** Find the quadrilateral of stars that make up the head of Draconis.
- The dimmest of these is the double star nu Draconis. This is easily split in binoculars with a reasonable power or a scope at x 20.
- Then move from nu slowly westwards about 5 degrees.
- You will find mu Draconis.

LL49 16/17 Draconis

LL49 is also known as: 16/17 Draconis
 Type of object: Multiple star
 Magnitude : 16, mag 5.5; 17A, mag 5.4; 17B, 6.4
 Where is it? Draconis

Why we like it.

16/17 Draconis appear to the naked eye as one star. Use some binoculars and they are easy to split.

This is what is called a optical double, two stars close together in the sky but not actually a single star system. In fact these stars have common proper motion and are about 400ly away.

Increase your magnification further, about 100x in a 4" scope, and 17 will become 2 stars and 16 will still be in the same field of view.

Separation between 16 and 17 is about 90arcsec and between 17A and 17B about 3.4arcsec.
 Super test of your instruments!

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Jan low in N, better by March	Well up in NE from 11pm	Over head at 11pm	Gets quite low in the North by Dec.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	★
Binoculars	★★★
Up to 100mm	★★★★
Up to 150mm	★★★
200mm	★★★

Map and pictures



How to find it.

- Find the quadrilateral of stars that make up the head of Draconis.
- The dimmest of these is the double star ν Draconis.
- Move steadily from ν Dra to μ Dra, then continue about 1.1 times the distance between ν and μ Dra to the next bright star.
- This is 16/17 Dra.

LL50 [NGC 7209]

LL50 is also known as: NGC 7209
 Type of object: Open Cluster

Magnitude : Naked Eye 4.0
 Where is it? Lacerta

Why we like it.

William Herschel recorded this as 53-7.
 Large, considerably rich, pretty compact. 20' dia, 50 stars
 mags 9-12.

In binoculars this is section of the milky way is a truly
 amazingly rich field of stars, and that can make this a
 challenge to separate this cluster from the other stars in the
 field of view.

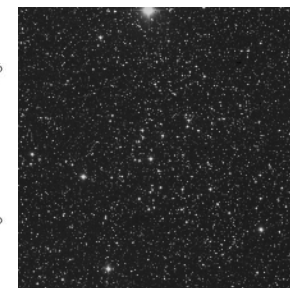
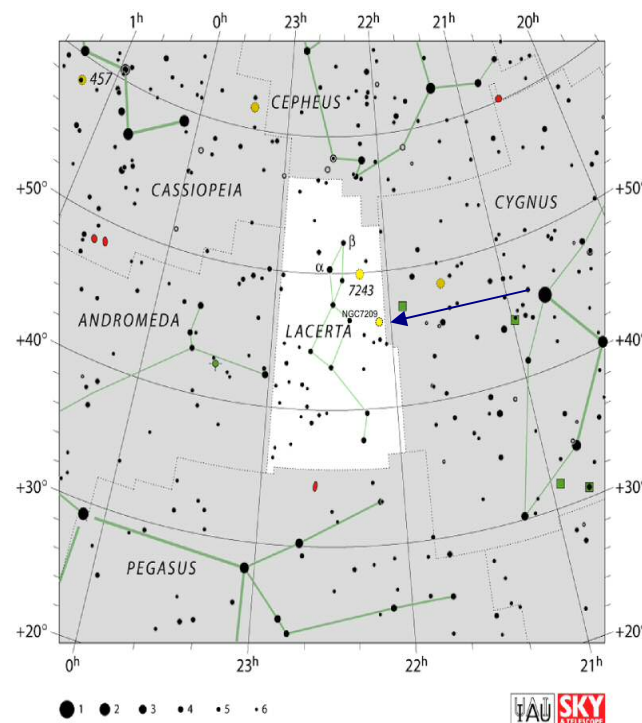
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Low in evening	Low in evening	Well up from 23:00	Overhead at 23:00

How best to see it.[some objects look better in smaller instruments]

Naked Eye	★
Binoculars	★★★
Up to 100mm	★★★★
Up to 150mm	★★★
200mm	★★

Map and pictures



How to find it.

Move from Delta Cygni towards Deneb, then continue about 1.5 times
 that distance again.

You should now be on the edge of the constellation Lacerta, at about
 the same level as 2-lac, the 5th star down the zig-zag of the main stars,
 and about 2.5 deg to its right.

LL51 NGC 7789

LL51 is also known as NGC 7789 or the White Rose Cluster
 Type of object: Open Cluster
 Magnitude : 6.7
 Where is it? In the constellation of Cassiopeia

Why we like it.

This cluster is also known as "The White Rose" Cluster or "Caroline's Rose" Cluster because when seen visually, the loops of stars and dark lanes look like the swirling pattern of rose petals as seen from above.

Its in a busy part of the sky. Cassiopeia is near the milky way and rich with objects. Many visible with binoculars or small telescopes. Just scanning this region on a September evening can be reward in itself.

7789 is a well documented cluster to your list and it can stand out well in good skies.

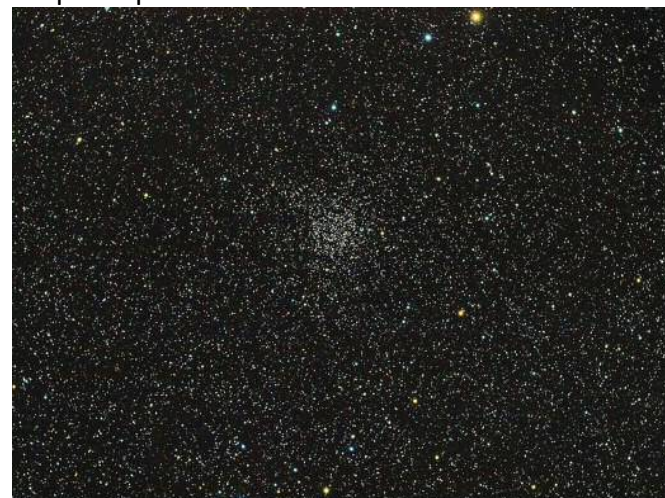
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

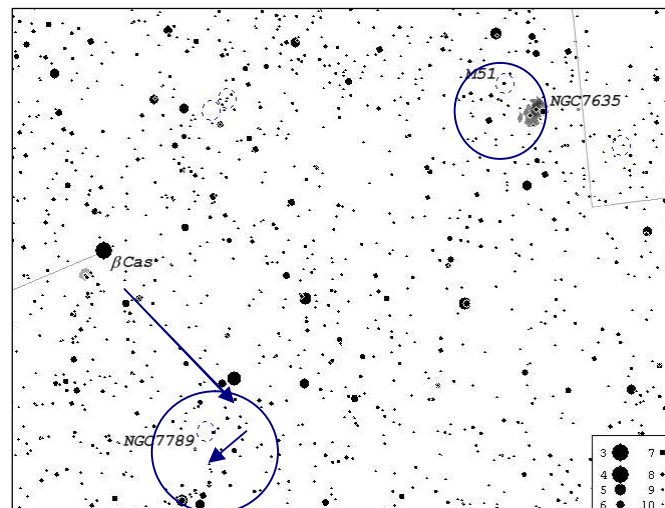
Naked Eye	
Binoculars	*** *
Up to 100mm	***
Up to 150mm	***
200mm	***

Map and pictures



How to find it.

Located SSW of the Messier object M51 and can be found by using low power binoculars. Its just as easy to locate Beta Cass and then move down (south and west) to the star marked on the map. NNGC 7780 or LL 51 is in the same field of view



LL52 [NGC 752]

LL32 is also known as Caldwell 28 or NGC 752
 Type of object: Open Cluster
 Magnitude : 6.7
 Where is it? In the constellation of Andromeda

Why we like it.

A nice open cluster in the constellation of Andromeda.

Best observed in low power eyepiece, or binoculars. A relatively old cluster with a lot of old yellow or orange stars.

Often forgotten because we are too busy looking at M31 – the Andromeda galaxy. This is a really nice cluster which is also a test of your star hoping skills. Bins reveal a faint scattering of stars – see if you can pick up the colours. A telescope is best used at powers of x 25 or below.

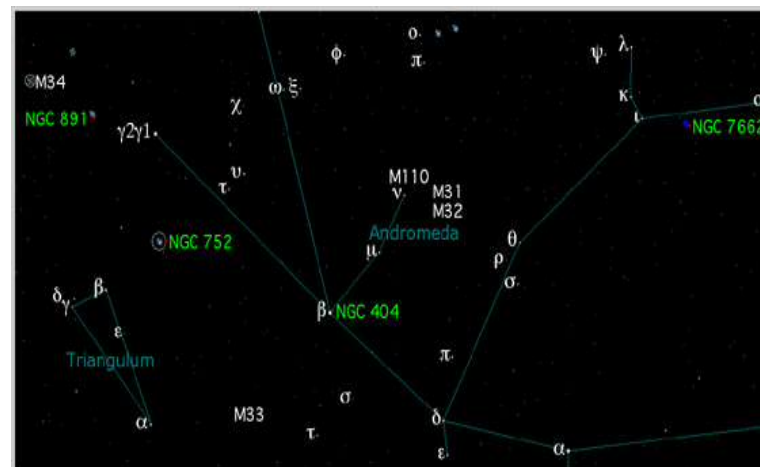
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Not visible	Rising in early hours -	Sunset onwards from the east

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	*** *
Up to 100mm	***
Up to 150mm	***
200mm	***

Map and pictures



How to find it.

Beta Andromedae is your start point. We use Beta to locate M31 – but this time we go the another way by moving north and east about 7 degrees. If you use your bins to find the fainter stars in Triangulum and work back towards Andromeda, 752 appears in your view. X 30 or above gives a nice view in a telescope.

LL53 Collander 69

LLn is also known as Col 69
 Type of object: Cluster
 Magnitude : 5.0
 Where is it? Top of Orion

Why we like it.

LL53 marks orions head so it's a doddle to find. Binoculars show a nice field, not many stars but an object that's easy to examine. X 20 is a good benchmark but if you have a scope with a bit more power and a wide field eyepiece, try that too.

It's a good object to start your sketching skills with because its small and should only take about 10-15 mins to record on paper. Try it with tripod mounted binoculars or a telescope at low power.

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	**
Binoculars	***
Up to 100mm	****
Up to 150mm	****
200mm	****

Map and pictures



Source: - hawastsoc.org – Hawaiian Astronomical Society.
 The Stars – A New Way to see them - H. A. Rey

How to find it.

LL53 is marked by lamda Orionis – the head of orion.

Start at Betelgeuse and Lamda forms the top of a triangle with Betelgeuse and Bellatrix. These two mark Orion's shoulders. Finderscopes will find the area fairly easily but keep your scope on low power.

LL54 Col 70

LL54 is also known as Collinder 70 but better known as Orion's Belt.

Type of object: Cluster

Magnitude : Naked Eye

Where is it? Orion – Central 3 stars of the belt

Coordinates]

Why we like it.

Most people have seen Col 70 without realising it. Collinder 70 includes all three belt stars: Mintaka (the Girdle), Alnilam (The string of Pearls) and Alnitak (the Belt). The cluster has a diameter of almost 3 degrees and consists of 100 stars or more. Most of them are of the 10th magnitude or brighter. It is a pleasing and underrated feature of our winter sky. Just get your binoculars on this one – no more than x10 really and if you can get them mounted on a tripod you will be able to see the fainter stars in the group. LL54 is a quick tick on your list but don't rush off quite yet. Take time to compare the bright lead stars of the belt with the other members of the cluster. You could use highest powers in telescopes for closer views but the impact is lost. Try to sketch the scene. Detailed maps will pick out doubles and multiples for you, but you will need an atlas or sources from the internet to identify some of these. Between Mintaka on the right and Alnilam is an S shape line of stars, often remarked upon by observers. It may take some practice to see this but the sketches do show it.

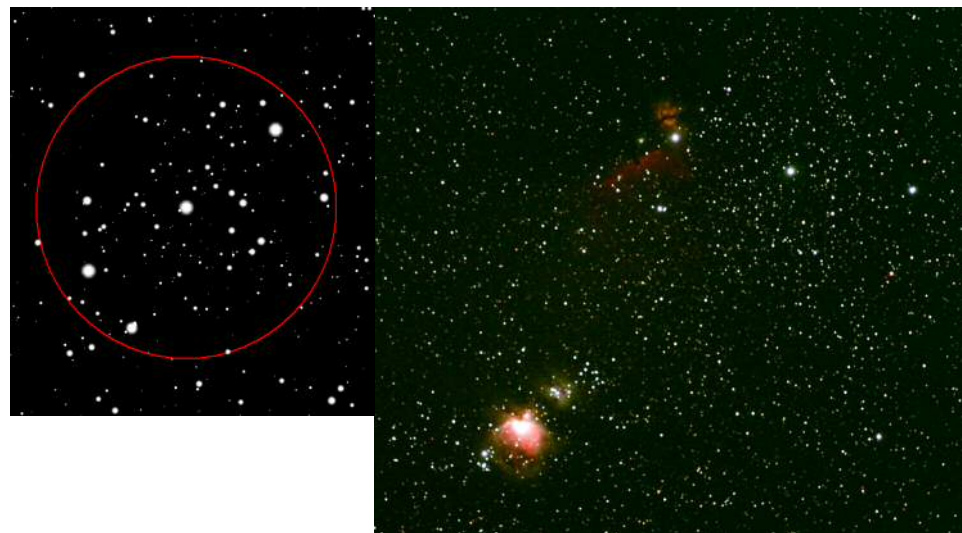
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in the dawn hours may be seen.	Sunset onwards especially from late autumn

How best to see it.[some objects look better in smaller instruments]

Naked Eye	***
Binoculars	****
Up to 100mm	**
Up to 150mm	*
200mm	

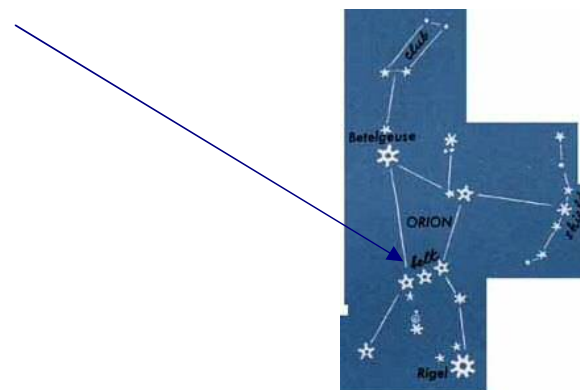
Map and pictures Sketch obtained from the internet and a photo posted on the Cloudy nights forum which also shows LL1 (M42).



How to find it.

Get a star atlas, find Orion.

Look at the middle of the constellation!



LL55 [NGC 2169 – the 37 Cluster]

LL55 is also known as NGC 2169 – 37 cluster.
Type of object: Open Cluster

Magnitude :
Where is it? Orion/Gemini border
Why we like it.

Less well known than other objects in this part of the sky, LL55 is a challenging object but well worth the reward. It's a small tight group of about 80 stars that look like a "37". In bins, you won't see the effect, the cluster is just about discernable in x10 and above as a squarish object and you may need to practice star hopping to be sure. Bins in this case are best mounted.

It really reveals itself at around x75 and above in a telescope but may not be obvious as a 37 if you are viewing through a telescope that reverses the image, or its upside down. To get an idea look at the image we have shown on this page and the sketch. The latter does not do it justice as the eye is best at picking out the detail. Take a while to examine the cluster. After a while you should see a suggestion of fainter stars around the main ones that define the numbers. Like the Owl Cluster (LL19), NGC 2169 is one of the objects that become a favourite and a nice one to show friends and family. If you can get access to a larger aperture scope such as a 5 or 6 inch in good skies, LL55 is great fun to hunt down.

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	**
Binoculars	***
Up to 100mm	****
Up to 150mm	*****
200mm	*****

Map and pictures



How to find it. You need patience for this one because the hop stars are faint. It is almost in Gemini in an area not far from their feet. The star hop however is from Orion. Locate Betelgeuse. This is Orion's shoulder. From there move up and to the left (North and east) along the arm towards two 5th mag stars that form the base of the club he is swinging. These are the two stars that you need to get into your binocular or finder field of view. Once you have them, draw a line between the two and then look for a squarish object that is below that line, slightly nearer to the left one. If you find it in Bins – well done, tick it off the list but you will need the scope to see the shape. A finder or a red dot finder should locate the region but these will not be able to see it. Providing they are well aligned to the main scope, it should be in the field of view. Use your lowest scope power first to find it and then change eyepieces. As this gets quite high in the sky, its good to practice this at moderate altitudes in mid to late autumn as Orion and Gemini rise in the east to north east.

LL56 Stock 2

LL56 also known as Stock 2
 Type of object: Cluster
 Magnitude : 5-7
 Where is it? constellation of Cassiopeia

Why we like it.

Nice open cluster located in Cassiopeia , best viewed in binoculars located east of Cassiopeia.

Rich and very large open cluster. Low in the sky. Impressive with small apertures and small magnifications.

Can be a challenge if you are looking at the double cluster [LL5] in the same area.

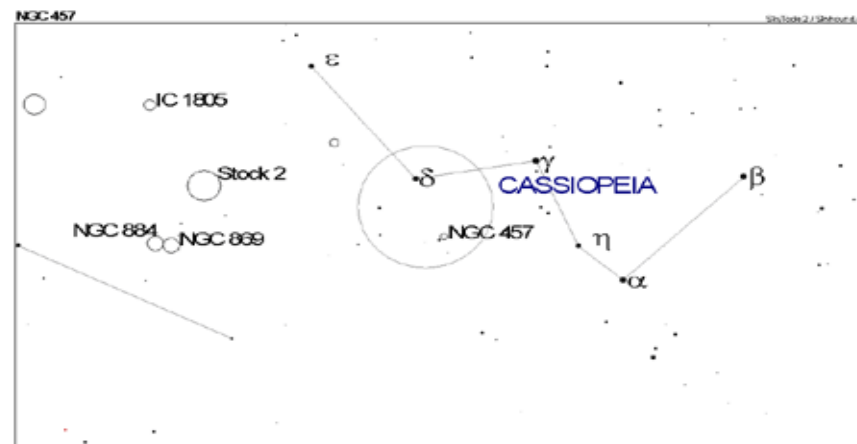
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	*** *
Up to 100mm	***
Up to 150mm	***
200mm	***

Map and pictures



How to find it.

- Follow the directions for the double cluster LL5 and then just slip a bit northwards towards cassiopeia.

LL57 Kembles Cascade

LL57 is also known as Kembles Cascade
 Type of object: Asterism
 Magnitude : 5-7
 Where is it? Constellation of Camelopardalis

Why we like it.

Also known as the hockey stick spread over an area of 2.5 degrees. Looks like a golf club or hockey stick.

This is quite a challenge. The first time I looked for it, the field of view in my 20 x 80 bins was 3.0 degrees but I still missed it. There are no bright stars nearby. Using a pair of 7 x 50s at 7.5 degrees field of view, it jumped out easily. So scan the area first before moving in with larger instruments. Given its size, telescopes with low power wide field eyepieces will show it well.

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	*** *
Up to 100mm	***
Up to 150mm	***
200mm	***

Map and pictures



How to find it.

Using a low power binoculars sweep across the top of the W of Cassiopeia 2x the distance of the W will put in the area. Distinguished by the clump of stars NGC 1502 at its base.



LL58 NGC 1981

LL58 is also known as NGC1981
 Type of object: Open Cluster
 Magnitude : Naked Eye 4.2
 Where is it? Orion RA 05:35.2 Dec -04:26

Why we like it.

NGC1981 is 'officially' the most over-looked open cluster in the sky, which is a shame, as it is one of the easiest clusters to find and arguably it has more to offer the urban observer than the Great Nebula, just below it.

Some see the cluster as a crown, which creates the lovely idea of a crown-topped hilt to Orion's sword. The stars that make up the cluster seem to be arranged in groups and lines and makes a very fine sight.

The darker the site the more stars you can tease out. How many stars can you see?

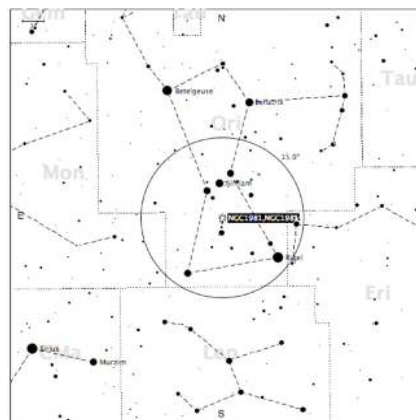
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening to after midnight	Just after sunset	Not visible – just before sunrise in Sept	After midnight to dawn then sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	★
Binoculars	★★★★
Up to 100mm	★★★★
Up to 150mm	★★★★
200mm	★★★

Map and pictures



http://www.perseus.gr/Images/s_dso-ngc-1981.jpg

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How to find it.

- Find the constellation Orion
- Locate the 3 stars that form the straight line of the belt of Orion
- Sweep down from the centre star, before you reach the Great Nebula you will see the open cluster.

LL59 M3

LL59 is also known as Messier 3/NGC5272.

Type of object: Globular cluster

Magnitude : 6.2

Where is it? Canes Venatici RA 13:42.2 Dec +28 : 23

Why we like it.

M3 is one of the oldest, largest and most spectacular global clusters.

It is at the limits of naked eye visibility from a very dark sky site, but any instrument will easily pick it out from all but the most light polluted location. In a small telescope you can get a hint of the spectacle, having a granular appearance, with a bright core.

In large telescopes it is a magnificent sight, a blizzard of stars surrounding a dazzling snowball.

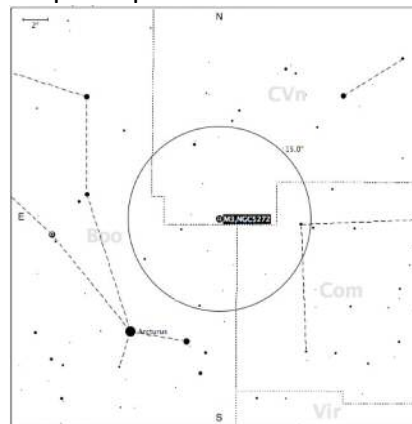
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Late evening to dawn	Dusk to dawn	Dusk to midnight	Just before dawn.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	★
Up to 100mm	★★
Up to 150mm	★★★
200mm	★★★★

Map and pictures



N.A.Sharp, Vanessa Harvey/REU program/NOAO/AURA/NSF (for details see Conditions of Use)

Image by Elliss Sharpe LAS – Isle of Wight March 2012



How to find it.

- Find the stars Arcturus in the Boötes and Cor Caroli in Canes Venatici
- M3 is about halfway between the two.
- Alternately locate the cluster Melotte 111 in Coma Berenices and look east about a fist width

LL60 Cor Corali

LLn is also known as Alpha Canes Venatici
 Type of object: Double star

Magnitude : 2.9, 5.6
 Where is it? The hunting dogs – Canes Venatici

Why we like it.

Nice, clean, simple double star. Derives its name from King Charles II (Heart of the Martyred King Charles). The colours are white with a hint of blue and yellow but that depends on seeing.

LL60 makes it to the list because it's a good star hopping challenge and is also near the realm of galaxies in that part of the sky. Star atlases will show you M63 and M94 both nearby. Neither are on our list but worth noting for a future visit if you have access to larger scope. Also in the area is a variable carbon star called Y Cvn. You will need a telescope to see it's reddish hue but bins should show its location as it makes a triangle with Cor Corali and Chara the other star in this straight line constellation.

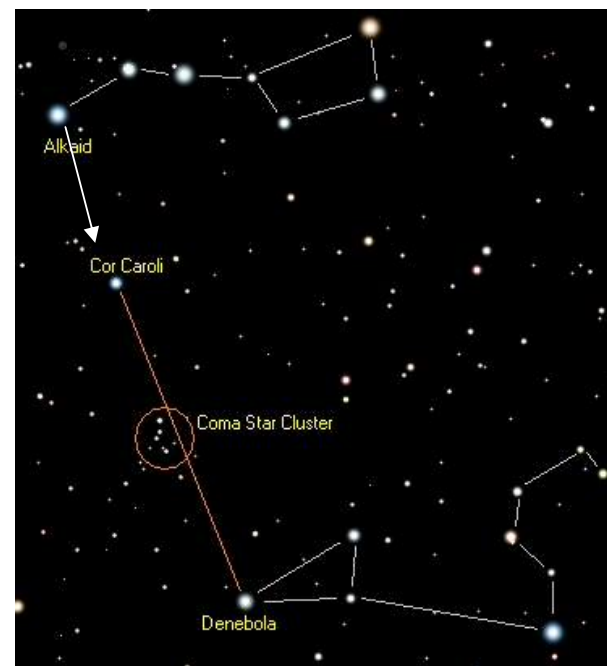
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Before Dawn, low in east	All night	Dusk to Midnight	Generally too low

How best to see it.[some objects look better in smaller instruments]

Naked Eye	★ ★
Binoculars	★ ★ ★
Up to 100mm	★ ★ ★ ★
Up to 150mm	★ ★ ★ ★
200mm	★ ★ ★ ★

Map and pictures



How to Find it.

- Start from Alkaid in Ursa Major (also used to hunt down LL62 and LL63). Move right and down slightly and both Alpha and Beta should appear in the field of low power binoculars.
- There are no other bright stars nearby so a bit of sweeping will help.
- Once you have them, relocating them in a finderscope is easier.
- Best time to start practicing is early spring or around 4am in the winter when the plough is rising in the east and Alkaid sits at the bottom of the plough. You can then move right and down as described earlier.

LL61 The mini coathanger

LL61 is also known as The minicoathanger
 Type of object: Asterism
 Magnitude : Mag 9-11
 Where is it? In Ursa Minor the little bear
Why we like it.

Unusual collection, not well known so we've added it to be a different from the usual list of objects casual observers.

Its always visible at anytime of year and is a nice comparison to LL19, The Coat hanger which you should ensure you have seen first before locating this one so that you get an idea of its shape.

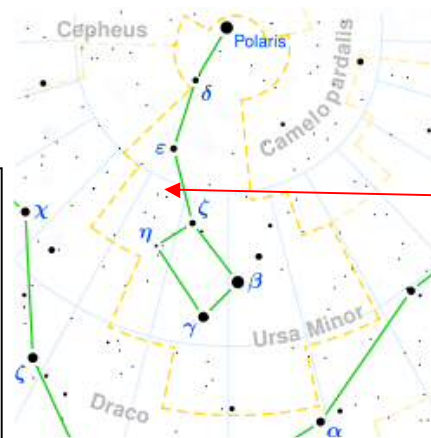
Not an imposing object, LL61 is attractive for its location and compactness. A nice object to hone your star hopping skills to.

When to see it.
 All year. The mini coathanger is circumpolar and visible all year.

How best to see it

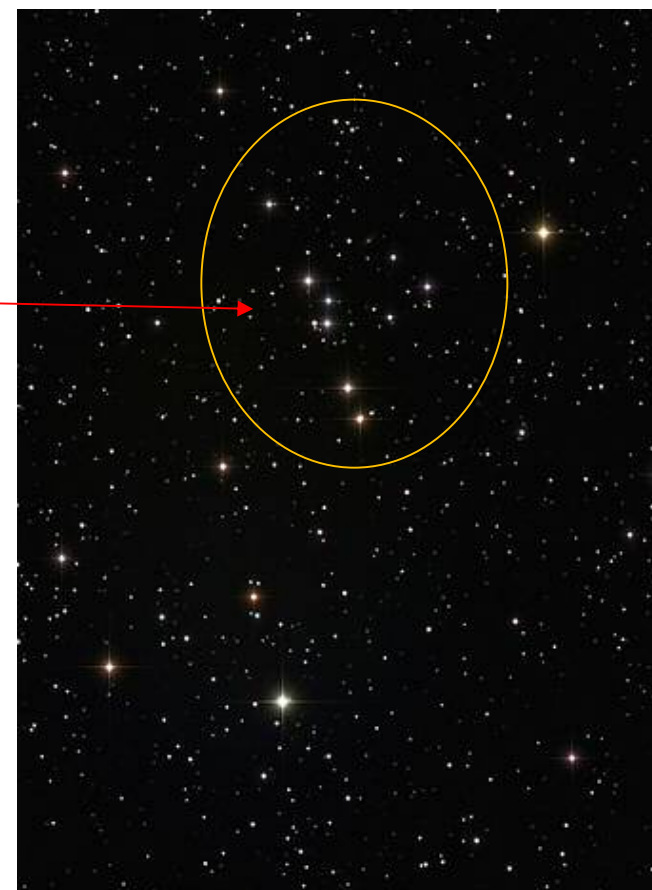
Naked Eye	
Binoculars	***
Up to 100mm	****
Up to 150mm	****
200mm	****

Map and pictures



How to find it.

- Locate Polaris.
- Move to delta and then to epsilon.
- Scan slowly eastwards and south by about 2 degrees.



LL62 and LL63 Kappa and Iota Bootis

LL62 and 63 is also known as Kappa and Iota Bootis

Type of object: Double Stars

Magnitude : 4.5, 6.6 and 4.8, 7.4

Where is it? Bootis and Ursa Major border

Why we like it.

These two LL objects can be observed in one go as you traverse the northern sky. Practically circumpolar, they can be seen most of the time except mid winter when they are skirting the northern horizon at evening observing times. Early spring and late summer present comfortable observing positions. Kappa needs a small scope at about x 30 and a 70mm scope should cope well. If not sure, just ramp up the power. Iota is further spaced and so a lower power should do it but I have struggled in x20 bins.

Look for some colour: observers suggest kappa has a white primary and a yellow companion and Iota a yellow primary with an orange companion. In H A Rey's pictorial of Bootes he is a herdsman smoking a pipe. Kappa and Iota mark the top of the pipe and Gamma and Lambda the stem

A good pair of pairs!

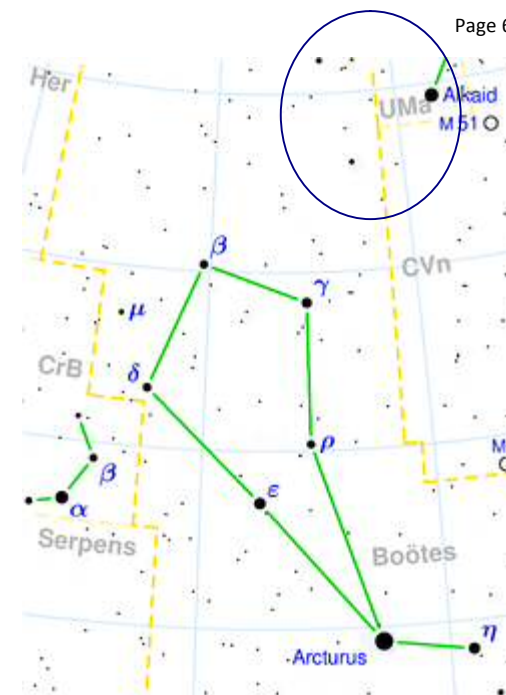
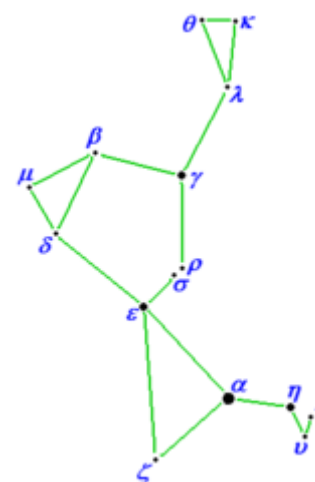
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Early hours in east	All night	Dusk to early hours	Sunset – low in west

How best to see it.[some objects look better in smaller instruments]

Naked Eye	★
Binoculars	★★
Up to 100mm	★★★★
Up to 150mm	★★★★
200mm	★★★★

Map and pictures



How to find it.

- Best start finding them with binoculars so that you get familiar with the field. It takes a bit of practice.
- Start with Alkaid in Ursa Major – that's the bright star at the end of the handle of the plough.
- Place Alkaid to the right of your field of view and kappa should just about squeeze in on the left in x7 or x10.
- If not just nudge a bit to the left (east) and both doubles should appear. Iota is visually below a line drawn east from Kappa to Theta which together mark the top of his pipe.
- A good finderscope which is well aligned to your main scope will locate all three in the field. Use your lowest power first in the scope before zooming.

LL64 Picot 1- Napoleans Hat

LL64 is also known as Napoleon's hat
Type of object: Asterism

Magnitude : 9.4 – 10.7
Where is it? Bootes 14 hr 14.9' Dec 18 deg 34'

Why we like it.

Er. Just a bit unusual. Not one that is often observed but easy to find with a telescope centred on Arcturus but you then need to move Arcturus out of the way to see it properly.

Made out of 7 stars. In this picture the hat is cocked to one side. One observer stated it looked more like a flying saucer.

We need LAS sketches or images please!!

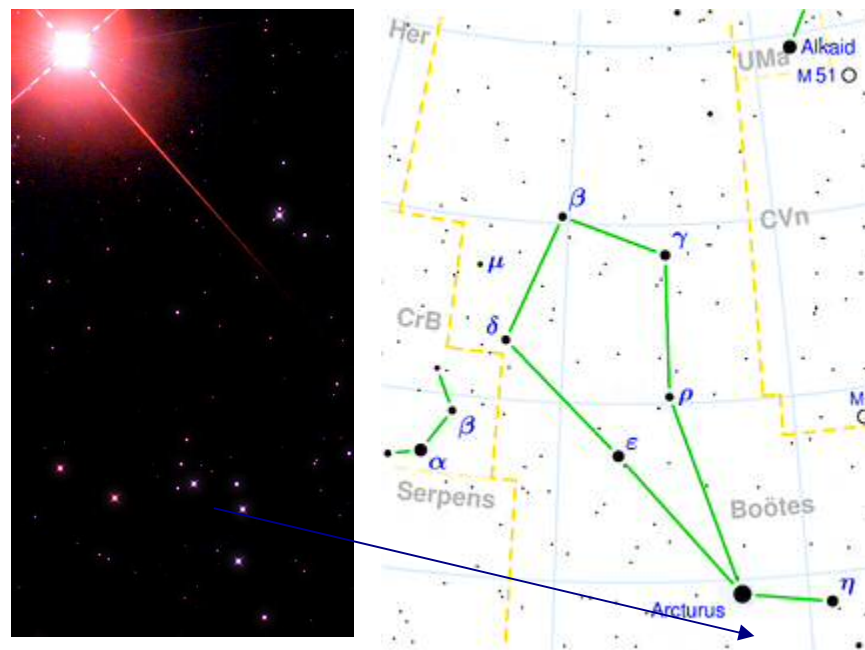
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	**
Binoculars	***
Up to 100mm	****
Up to 150mm	*****
200mm	*****

Map and pictures



How to find it.

Find Arcturus.

Move half a degree south. Look carefully!

If you can see it – send your observation into the LAS Gallery!

LL65 [M5]

LL65 is also known as M 5
 Type of object: Open Cluster

Magnitude : 6.6
 Where is it? Serpens Caput

Why we like it.

Really nice Globular in a faint part of the sky, M5 is the herald of a line of globular clusters eastwards towards Ophiuchus and north to Hercules.

It is one of the largest and oldest globulars associated with our Milky Way and competes well with M13. It has a strong gravitational influence on its nearby surroundings.

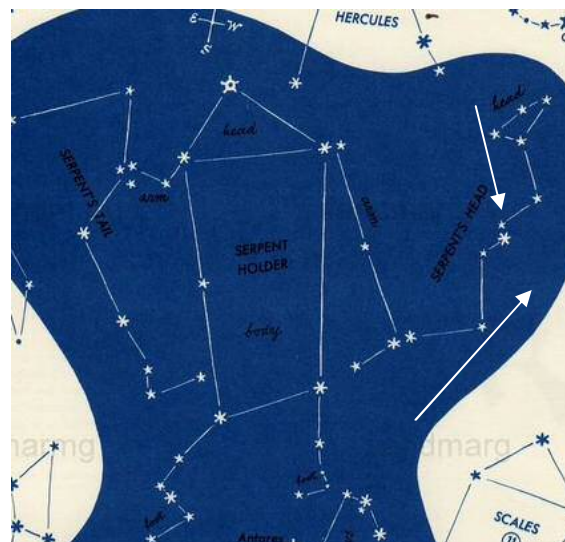
M5 was originally discovered by Gottfried Kirch in 1702 and again by Charles Messier in 1764

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
From late at night low in east	From east in the evening to overhead. Through the night	Sets by mid evening.	Not visible

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	***
Up to 100mm	****
Up to 150mm	****
200mm	****



Craig and Tammy Temple

Image. cs.astronomy.com/asycs/media/p/417744.aspx

Map

<http://www.etsy.com/listing/68637615/1952-star-constellation-chart-libra>. H A Rey

How to find it.

The right hand part of the Serpent Holder is the head of the snake. Locate the head and then move south to place two bright stars from its neck in the centre of your field of view. The brightest is Alpha.

Then move south and east and 5 degrees (towards 4 o'clock) and M5 should pop into view.

LL66 Mu Hercules

LL32 is also known as Mu Herculis
 Type of object: Double star
 Magnitude : 6.7
 Where is it? In the constellation of Hercules

Why we like it.

The close binary system is a challenge for telescopic systems. Consisting of a yellow star spectroscopically similar to our star.

A brown dwarf and two other stars which are too faint to be seen in amateur instruments.

We put this is as a bit of a challenge for members. Double stars can be a real test for your optics but they hang majestically in the night, like jewels, just out of reach. Great item for your summer list – high up at zenith.

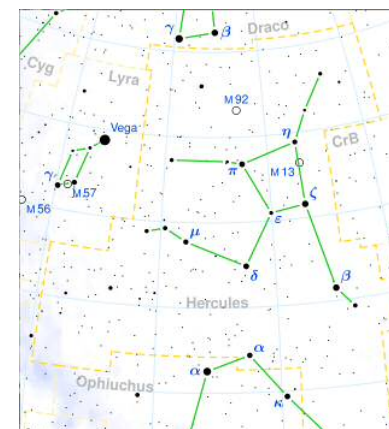
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Not generally visible	Low in the east rising	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	★ ★
Up to 100mm	★ ★ ★
Up to 150mm	★ ★ ★
200mm	★ ★ ★

Map and pictures



How to find it.

- Locate the keystone containing M13 first.
- Then select the faintest star – epsilon.
- Move down to delta and then drift slowly eastwards to locate Mu.
- Mu will be visible in your finderscope or binoculars
- But you will need higher power to split it.

LL67 UX Draconis

LL67 is also known as UX Draconis
Type of object: Carbon Star - variable

Magnitude : 5.9 – 7.1
Where is it? Draco the Dragon 19h 21.6' 76 deg 34'

Why we like it.

Its very red and more easily seen in a telescope than bins but the latter can be a help to find it or locate the area. Its variable from 5.9 to 7.1 When I first found it, admittedly using a computerised scope, I was astounded.

It is far redder than Antares and more of a mellow hue that the Garnet star (LL39).

Its unusual being a carbon star and makes our list for that reason. LL67 is our hardest object in Version 1 of the Loughton List. If you find this one, you deserve a warm coffee afterwards!

When to see it.

UX has a declination of 76 degrees. That means from Loughton it never gets below 25 degrees altitude above the horizon (76-51). It will be overhead during autumn evenings. Best observed at middling altitudes.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	★
Up to 100mm	★★★★
Up to 150mm	★★★★
200mm	★★★★

Map and pictures



How to find it.

Locate the feet of Draco (X and Epsilon). Draw a line between the two and move halfway. Then move 1.5 degrees north towards Polaris. This may be up down, or sideways depending on time of year. From here I have found sweeping in an arc from Tau towards X and then back up following a trail of 6th and 7th mag star towards a clump of stars where UX sits works, but it needed practice. UX gets its gold rating due to this test of star hopping but with practice you can just hop the three degrees north from Tau. For location checking purposes its not far from 59 Draconis and a nearby double star which most star maps should show.

LL68 39 Draconis

LL68 is also known as 39 Draconis
 Type of object: Triple Star (actually 7)

Magnitude : 5.1, 8.0, 8.1
 Where is it? Draco 18:23:54 +58 48'

Why we like it.

Challenging double that can be split into three if you have access to a 5inch or more scope at 150x. It is infact a multiple system of 7 stars which would play havoc with the seasons, not to mention finding a dark sky from any planet in that system!

At lower powers – around 20 to 25 x you should be able to split 39 Draconis into 2 stars. What colours do you see?

39 is near the head which is not far from Lyre and so is more of a spring, summer through to autumn object.

Draco offers 5 LL objects, 39 Dra, UX Dra, the double 16, 17 Draconis, Kemble 2 and Mu. Draco is a large constellation and partly circumpolar and therefore can be on your observing plans most nights. Its a constellation worth getting to know and trace because there are more objects beyond the 5 LL ones to explore.

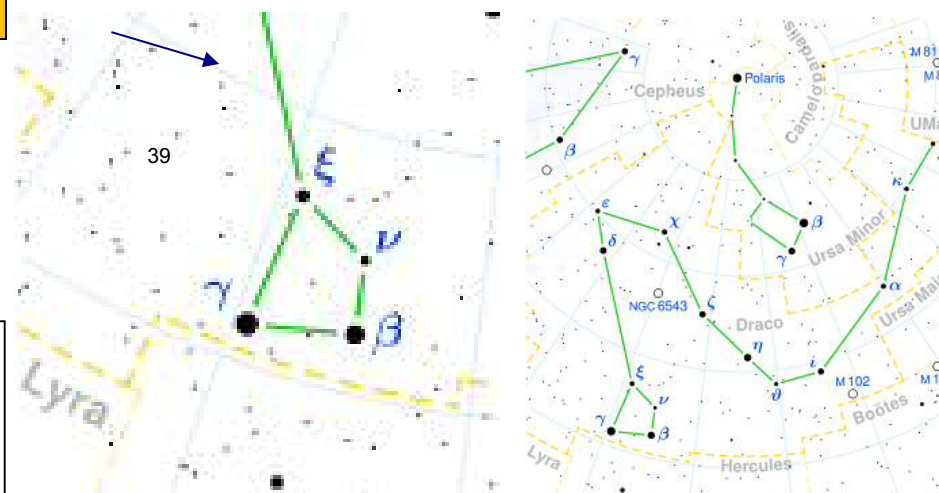
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Late at night to dawn	From dusk onwards	All night	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	★ ★
Up to 100mm	★ ★ ★ ★
Up to 150mm	★ ★ ★ ★
200mm	★ ★ ★ ★

Map and pictures



How to find it.

This time start at the head of Draco which is the lopsided square.

Locate Xi which is at the top in our diagram. Move it to the edge of the binocular field and 39 Draconis should appear at the other end of the field of view. You may find a more detailed star atlas helpful for this one, but once you have it – its easy to locate again.

LL69 Kemble 2

LL69 is also known as Kemble 2.
Type of object: Asterism

Magnitude : Stars of 7.0 to 9.0
Where is it? In Draco – visible most of the year, at its
feet near Chi. 18h 35m 72 deg 23’

Why we like it.

It looks like Cassiopeia!! Discovered by Lutian Kemble, this group of unrelated stars is on our Gold list, more because of its location than its size or brightness. I found it first time in 10*70 bins but its bright enough to be found in smaller sizes.

A zoom up to x25 reveals a pretty object with an uncanny resemblance to its grander cousin. Add this one to your tour and it will be of interest to friends and fellow observers.

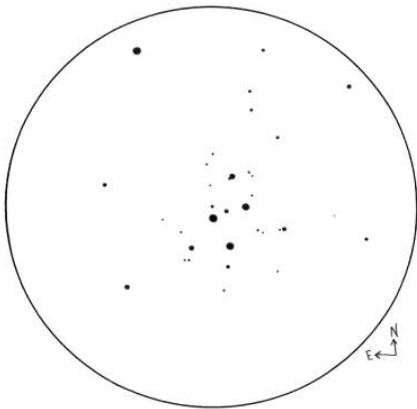
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Best in early hours	High in North East.	North West from dusk.	Lower down to the Northern sky.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	***
Up to 100mm	****
Up to 150mm	****
200mm	****

Map and pictures



How to find it.

Start with Polaris and trace the little plough to its own pointers. Draw a diagonal line from the brightest (Kochab) to the other side of the box. Then continue this line to the feet of Draco the Dragon. This is marked by Chi which is fairly bright in binoculars at about magnitude 3.5. Place Chi slightly to one side of your field of view and Kemble 2 should appear. Whether it is a “W”, and “M” or something inbetween will depend on the time of year you are observing, but being a northern object it should be visible for much of the time.

LL70 Collinder 350

LLn is also known as Coll 350

Type of object: Cluster

Magnitude : 6.1

Where is it? Ophiuchus 17 h 48.1 1 Deg 18'

Why we like it.

Off the beaten track. Not many observers will know this one. Its actually quite near IC 4665 - or LL42 and sits near the shoulder of Ophiuchus.

I have picked this up in Bins as a spread out group spread across nearly a degree of sky so its quite a large item. As most of the stars are fainter, it will take some power quite well using a small telescope. French says there are 4 spidery arms – can you see them?

When to see it.

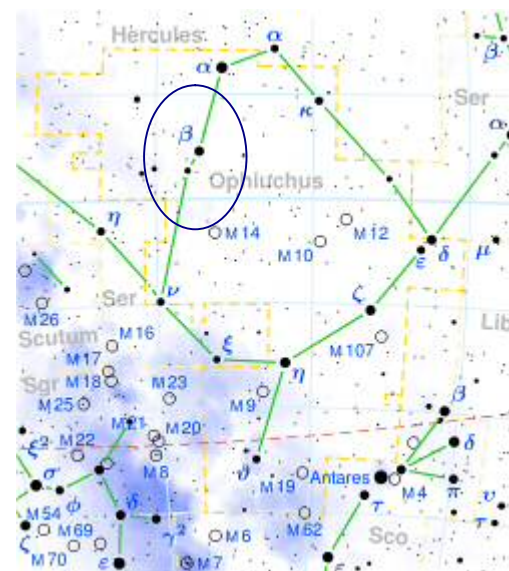
Jan – Mar	Apr – June	July – Sep	Oct – Dec
Out of view except around dawn in the spring.	From evening through the night	From dusk – in the west, setting by early hours.	Sunset onwards, very low and then out of view.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	***
Up to 100mm	****
Up to 150mm	****
200mm	****

Map and pictures

Images proved difficult to locate so LAS members are invited to sketch or image this one!



How to find it.

As for LL 42. Look for Beta Ophiuchi.

Then move your instrument to gamma (south and west to 8 o'clock).

Position gamma in the top half of your field of view and Col 350 should appear at low power. Note that other LL objects, M10 and M12 are located nearby. M 14 which is not in the list (yet) is also visible using binoculars.

LL71 Stephenson 1

LLn is also known as Stephenson 1
 Type of object: Cluster
 Magnitude : Naked Eye 3.8
 Where is it? Lyre 18 hs 54.0' 36 deg 52'N

Why we like it.

Not well known actually. When we were putting this guide together, some of the major atlases did not have it. We picked it up from one of Sue French's articles and is a feature of LAS summer skies presentations from time to time. Its centred around delta 1 and delta 2 lyrae. These are a wide pair easily splittable in binoculars and the rest of the stars nearby form the cluster.

Can you see any colours? Delta 1 is supposed to be bluish and delta 2 more orange or red. The rest of the cluster is faint but a good target to practise seeing what can be detected with different instruments and powers.

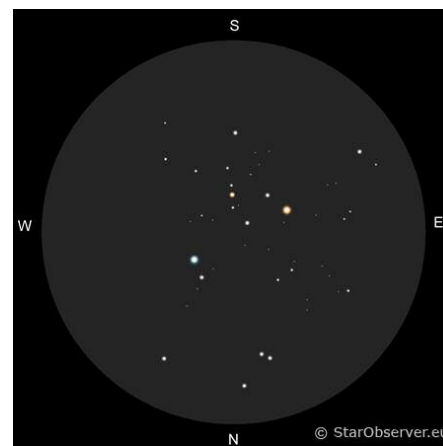
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Catch before dawn.	Rising in north east to overhead by middle of night	Dusk to end of night south to north west	Low in west at dusk and then lost to view.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	★ ★
Binoculars	★ ★ ★
Up to 100mm	★ ★ ★ ★
Up to 150mm	★ ★ ★ ★
200mm	★ ★ ★ ★

Map and pictures



Source – Starobserver.eu



How to find it.

Locate Vega which is the 5th brightest star in the sky.

If you are doing this for the first time, try to avoid searching when Vega is overhead as it's a bit of a neck stretch!

With Vega towards the west (right) side of your field of view, arc eastwards and southwards to zeta and delta as in the map.

Infact, with a low power the small square of Lyre should fit in your field of view. Stephenson 1 will be centred on the top left star of the square, Delta 1 and delta 2.

LL72 [M29]

LLn is also known as M29
Type of object: Cluster

Magnitude : 6.6
Where is it? Cygnus RA 20h 23.9' Dec 38 deg 32'

Why we like it.

Tight little group near Sadr in Cygnus. Quite a challenge to track down against the back drop of the Milky Way so a good one to put on your list.

Sue French in her book *Celestial Sampler* describes M29 as a set of back to back parentheses. To me, it looks like a shimmering square with about a dozen stars in it. Not the most inspiring of the Messier objects but one to search for during summer and autumn months

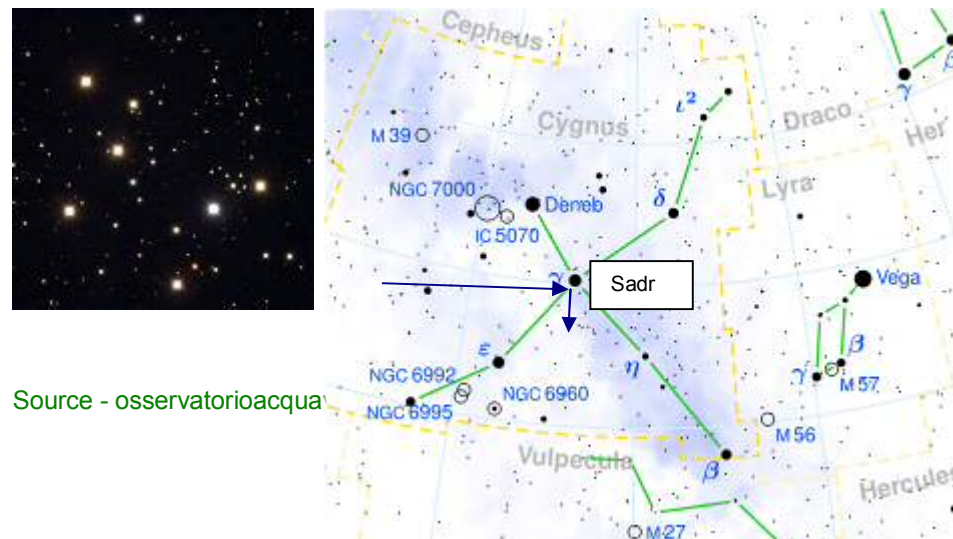
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Low in North	Rising in north East and to south through the night	Easy to track through most of the evening to late at night	Sunset onwards becoming low in the west by late autumn

How best to see it.[some objects look better in smaller instruments]

Naked Eye	**
Binoculars	***
Up to 100mm	****
Up to 150mm	*****
200mm	*****

Map and pictures



Source - osservatorioacqua

How to find it.

- Locate Deneb in Cygnus - one of the summer triangle stars.
- Then move south and east to Sadr (gamma) which is the next bright star in the cross that forms the centre of the Swan.
- Place your bins or scope on Sadr.
- Then move south about 2 degrees. M29 should appear in your field of view.

LL73 The Toadstool

LL73 is also known as	Toadstool
Type of object:	Asterism
Magnitude :	5-7
Where is it?	Delphinus 21h 07.3', 16° 20' dec

Why we like it.

Its different. Its quirky. Its... well. Maybe it looks more like a fish than a toadstool but one to add to the list during summer and early autumn. Also known as the dolphins diamonds

This is a bit of a challenge for small instruments but use these to locate the area as its bright enough for bins.

One observer from the US commented "Wonderful little asterism. I could count 13 stars at 256x in the toadstool and could just see NGC 7025 the extremely small lenticular galaxy shown at the extreme left above. At 112X, it really starts to show it's beauty."

Well – there you have it. A bit off the beaten track, but a nice diversion from the standard lists. Good luck.

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

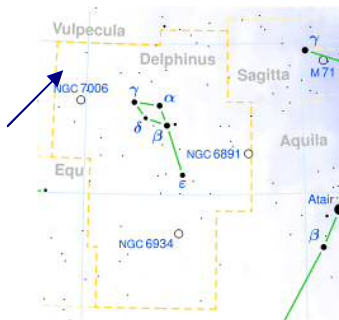
Naked Eye	
Binoculars	★★
Up to 100mm	★★★
Up to 150mm	★★★★
200mm	★★★★★

Map and pictures



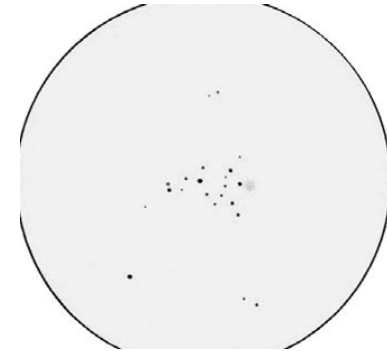
<http://www.deep-sky.co.uk/asterisms.htm>
Takahashi FSQ106 and Canon 20Da

Sketch http://assa.sao.ac.za/sections/deepsky/delights/2008_oct_deepsky_delights.pdf



How to find it.

- Locate Altair. Move east and you should see the tight constellation of Delphinus which is LL20 in our list.
- Select gamma which is the nose. Move 5 degrees east to NGC 7006 and then continue for 2 degrees. The Toadstool is a tight group at medium power x40 or so. Its shape may be more apparent at 100x plus.



LL74 M56

LL32 is also known as M56
 Type of object: Globular Cluster
 Magnitude : 6.7
 Where is it? In the constellation of Lyra

Why we like it.

This globular cluster is often overlooked by its more showy neighbour M57 or the ring nebula which is also in Lyra. But is worth tracking down due to its pretty nature of this cluster.

Globular clusters are among our favourites because they are easily visible in small instruments like binoculars but a good refractor or reasonable sized reflector will be very rewarding.

Along with other members of the Loughton List LL74 high in Lyra is a

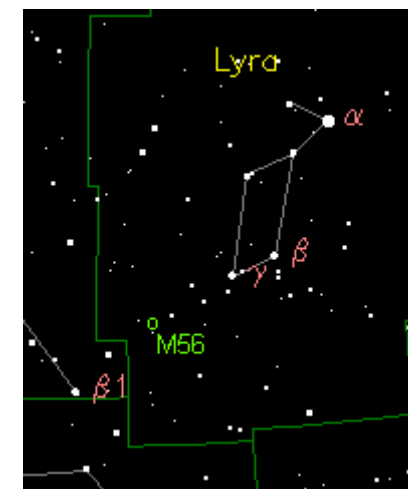
When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	★ ★
Up to 100mm	★ ★ ★
Up to 150mm	★ ★ ★ ★
200mm	★ ★ ★ ★

Map and pictures



How to find it.

- Finding M56 isn't too hard since it's located about half-way between Beta Cygni (Albireo) and Gamma Lyrae.
- In both binoculars and finder scope, you will see a triangle of stars when progressing from Gamma towards the southeast that will almost point directly at it!

LL75 NGC 7243

LL75 is also known as Caldwell 16 and NGC7243
Type of object: Open Cluster
Magnitude : 6.7
Where is it? In the constellation of Lacerta

Why we like it.

This open cluster is best seen in binoculars as a loose collection of blue and white stars. Although it can be difficult under light polluted sky to pick out from the general background of the milky way

To be honest - this is a toughie. Steve and I were observing this at Kelling Heath in a fine september evening and we got lost. The Milky Way in this area is truly lovely and your dreams are entwined with the majesty of a future beyond our time.

Lacerta is the lizard and you need to locate the 4th and 5th mag stars first. Once you have them and alpha just drift across to the right. Even if you are not sure, enjoy the view!

When to see it.

Jan – Mar	Apr – June	July – Sep	Oct – Dec
Evening - end of night	Dusk or just before dawn	Rising in early hours - to well seen from midnight	Sunset onwards.

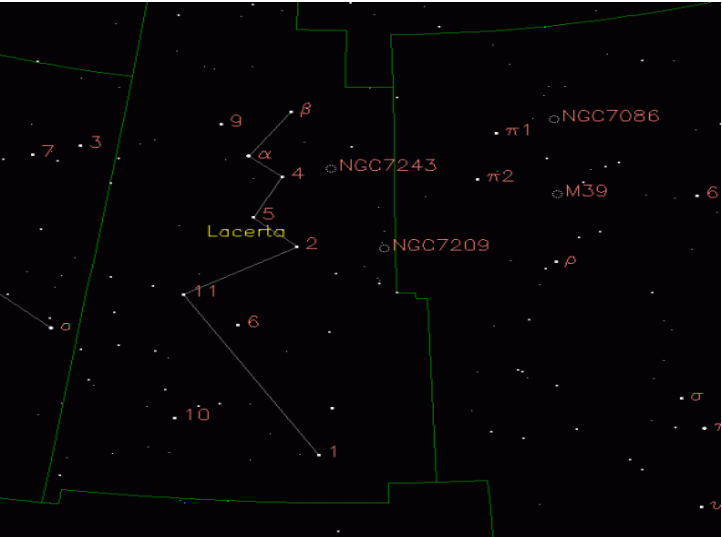
How best to see it.[some objects look better in smaller instruments]

Naked Eye	
Binoculars	*** *
Up to 100mm	***
Up to 150mm	***
200mm	***

Map and pictures



How to find it.
Located near the naked eye Alpha Lacertae



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The Loughton List Marathon!!! – Introduced in autumn 2012 in Version 2.0 of the Loughton List.

Most of the LL objects are visible at most times of the year. When we presented the List at the **2012 Isle of Wight Star Party**, we were asked if a marathon was available. A great idea. Whilst the Loughton Astronomical Society – E-Sphere can show you what is up at any time, the lists below will help you trek across the sky. Most of the objects are close together both locationally and sequentially in the book, but there are some gaps when you will have to wait for objects to rise or jump to other pages.

The Marathons are designed as follows. There is a start and end point which assumes an observing start time approximately an hour after sunset. This is the primary time for that Marathon with the start point being objects in the west. We have assumed that for most observers, evening is the likely observing period to start off. So for example – LLM1 is the primary marathon to use in the spring starting with M31 low in the north west just after sunset. You can of course start LLM1 in September for example when M31 is high in the south at around 7pm but you may have to wait a while for the rest of the list to rise. In which case LLM3 is the recommended marathon starting with M3 if you are observing in the autumn. As you will see, the marathons are the same sequence with different start points although we have made a some small changes given that light will interfere in the summer months. The bold text indicates the primary marathon for that quarter. The two main marathons are LLM1 and LLM3, March and September respectively.

Loughton List Marathon #	Start point	End point	Timing	Mid Date
LLM1	LL7 – Andromeda Galaxy (M31)	LL75 –Cluster NGC 7243 in Lacerta	Dusk – 7pm to 4am	March 15
LLM2	LL 46 Iota Cancri	N/A	Dusk 11pm to 3.30am (latest possible time)	June 15
LLM3	LL37 – Melotte 111 in Coma Berencies	LL 47	Dusk 7pm to 4am	Sept 15
LLM4	TBA	TBA	Dusk 4pm to Dawn 7.30am	Dec 15

At time of writing, these marathons are yet to be fully tested and so any feedback will be welcome!!!!

- Like the Messier Marathon, the sequences are partly based on the objects Right Ascension coordinates (RA) – working eastwards. In some cases, depending on the exact time of your observation and horizon, you may not be able to see lower declination objects in the order suggested, or may be able to jump ahead of the list to objects that are further east in RA but have a higher Declination (DEC).
 - Therefore, where it makes sense to do so, we have ignored the RA position if locationally the next object is nearby. For example, on a RA basis LL10 (M36) is further east than LL1, LL53 and LL58,(all in Orion) yet it is very near to LL4 and LL11 (M37 and M38), so these objects are placed together in the Marathon. As a result the marathon splits into localised “rambles”, focusing on groups of objects near to each other before moving

on with larger step to the next group. We have split the marathon into three chunks and plotted the suggested pathway on **the Loughton e – Sphere**. (see below)

- It's also possible to “cheat” if you have limited time. For example, in LLM1 we have a start point of the Andromeda Galaxy and an end point of LL75 – NGC 7243 which is a cluster in Lacerta. At the start of the marathon LL75 will be visible in the North and onwards through the evening before rising again in the early hours, so if you think the clouds are due to roll in later, you can jump to the end of the marathon and pick up objects that are near to Andromeda but westward of the start point!

The Loughton E – Sphere.

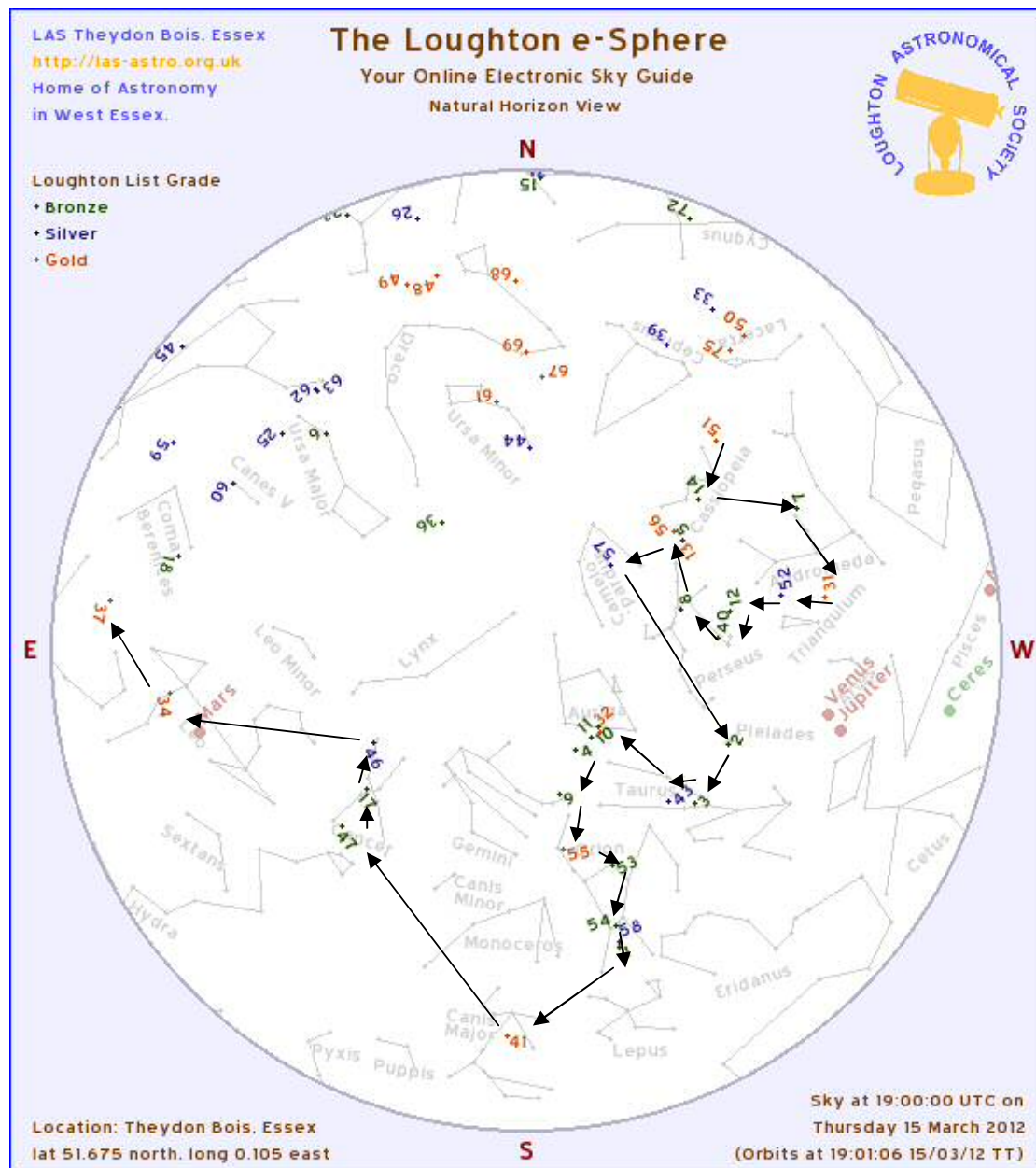
Designed and implemented by Allan Bell of Loughton Astronomical Society. This is a programmable planisphere showing the LL objects plus solar system objects for many locations around Europe.

You can type in your date, time and location and it will produce the current sky for you. See the Loughton Website www.las-astro.org.uk We have extracted versions of the e sphere to show you the suggested routes for the marathon starting in **Mid March** and **Mid September**. The maps can be adapted for June and December starting times – however in June there are only 4-5 observing hours and in December the night should be long enough to see all the objects other than those very near the sun at sunset or dawn.

You don't have to use the suggested routes on the map. They are produced as a guide – you can simply refer to the sequential listing for each marathon and use the Loughton List guide to locate the object.

Loughton List Marathon LLM1 – March – Suggested Sequence.

No.	LL Ref	Object	Constellation	Grade	No.	LL Ref	Object	Constellation	Grade	No.	LL Ref	Object	Constellation	Grade
1	LL51	NGC 7789	Cassiopeia	Gold	26	LL41	M41	Canis Major	Gold	51	LL27	M16	Serp Cauda	Silver
2	LL14	NGC 457	Cassiopeia	Bronze	27	LL47	M67	Cancer	Bronze	52	LL30	M24	Sagittarius	Gold
3	LL7	M31	Andromeda	Bronze	28	LL17	M44	Cancer	Bronze	53	LL22	M11	Scutum	Silver
4	LL31	M33	Triangulum	Gold	29	LL46	Iota Cancri	Cancer	Silver	54	LL15	Double Double	Lyra	Bronze
5	LL52	NGC 752	Andromeda	Silver	30	LL34	M65/66	Leo	Gold	55	LL71	Stephenson 1	Lyra	Silver
6	LL12	M34	Perseus	Bronze	31	LL37	M87	Virgo	Gold	56	LL38	M57	Lyra	Silver
7	LL40	Algol	Perseus	Bronze	32	LL18	Melotte 111	Coma Berenices	Bronze	57	LL74	M56	Lyra	Silver
8	LL8	Melotte 20	Perseus	Bronze	33	LL60	Cor Corali	Canes Venatici	Silver	58	LL16	Alberio	Cygnus	Bronze
9	LL13	NGC 957	Ursa Major	Gold	34	LL25	M51	Canes Venatici	Silver	59	LL19	Coat Hanger	Vulpecula	Bronze
10	LL5	Double Cluster	Perseus	Bronze	35	LL6	Mizar/Alcor	Ursa Major	Bronze	60	LL21	M27	Vulpecula	Silver
11	LL56	Stock 2	Cassiopeia	Gold	36	LL63	Iota Bootis	Bootis	Silver	61	LL35	M71	Sagitta	Gold
12	LL57	Kembles Cascade	Camelopardalis	Silver	37	LL62	Kappa Bootis	Bootis	Silver	62	LL20	Delphinus	Delphinus	Bronze
13	LL2	M45	Taurus	Bronze	38	LL59	M3	Canes Venatici	Silver	63	LL73	Toadstool	Delphinus	Gold
14	LL3	Hyades	Taurus	Bronze	39	LL64	Picot 1	Bootis	Gold	64	LL24	M15	Pegasus	Silver
15	LL43	NGC 1647	Taurus	Silver	40	LL45	Izar	Bootis	Silver	65	LL72	M29	Cygnus	Bronze
16	LL10	M36	Auriga	Bronze	41	LL65	M5	Serp Caput	Silver	66	LL68	39 Draconis	Draconis	Gold
17	LL32	Cheshire Cat	Auriga	Gold	42	LL49	16, 17 Draconis	Draconis	Gold	67	LL69	Kemble 2	Draconis	Gold
18	LL11	M38	Auriga	Bronze	43	LL48	Mu Draconis	Draconis	Gold	68	LL67	Ux Draconis	Draconis	Gold
19	LL4	M37	Auriga	Bronze	44	LL23	M13	Hercules	Bronze	69	LL61	Mini Coathanger	Ursa Minor	Gold
20	LL9	M35	Gemini	Bronze	45	LL26	M92	Hercules	Silver	70	LL36	M81/82	Ursa Major	Bronze
21	LL55	NGC 2169	Orion	Gold	46	LL66	Mu Hercules	Hercules	Gold	71	LL44	Engagement Ring	Ursa Minor	Silver
22	LL53	Col 69	Orion	Bronze	47	LL29	M12	Ophichus	Silver	72	LL39	Garnet Star	Cepheus	Silver
23	LL54	Col 70	Orion	Bronze	48	LL28	M10	Ophichus	Silver	73	LL33	M39	Cygnus	Silver
24	LL58	NGC 1981	Orion	Silver	49	LL42	IC4665	Ophichus	Bronze	74	LL50	NGC 7209	Lacerta	Gold
25	LL1	M42	Orion	Bronze	50	LL70	Col 350	Ophichus	Silver	75	LL75	NGC 7243	Lacerta	Gold



The Loughton List Marathon #1 –

suggested route **starting at dusk in mid spring** – first third up to LL 37 in Virgo which should be well into the East by the time you reach it.

It commences with LL 51 or NCG 7799 in Cassiopeia but you could start with LL7 the Andromeda galaxy.

You could chose nearby starting points such as LL 31 – which is M33.

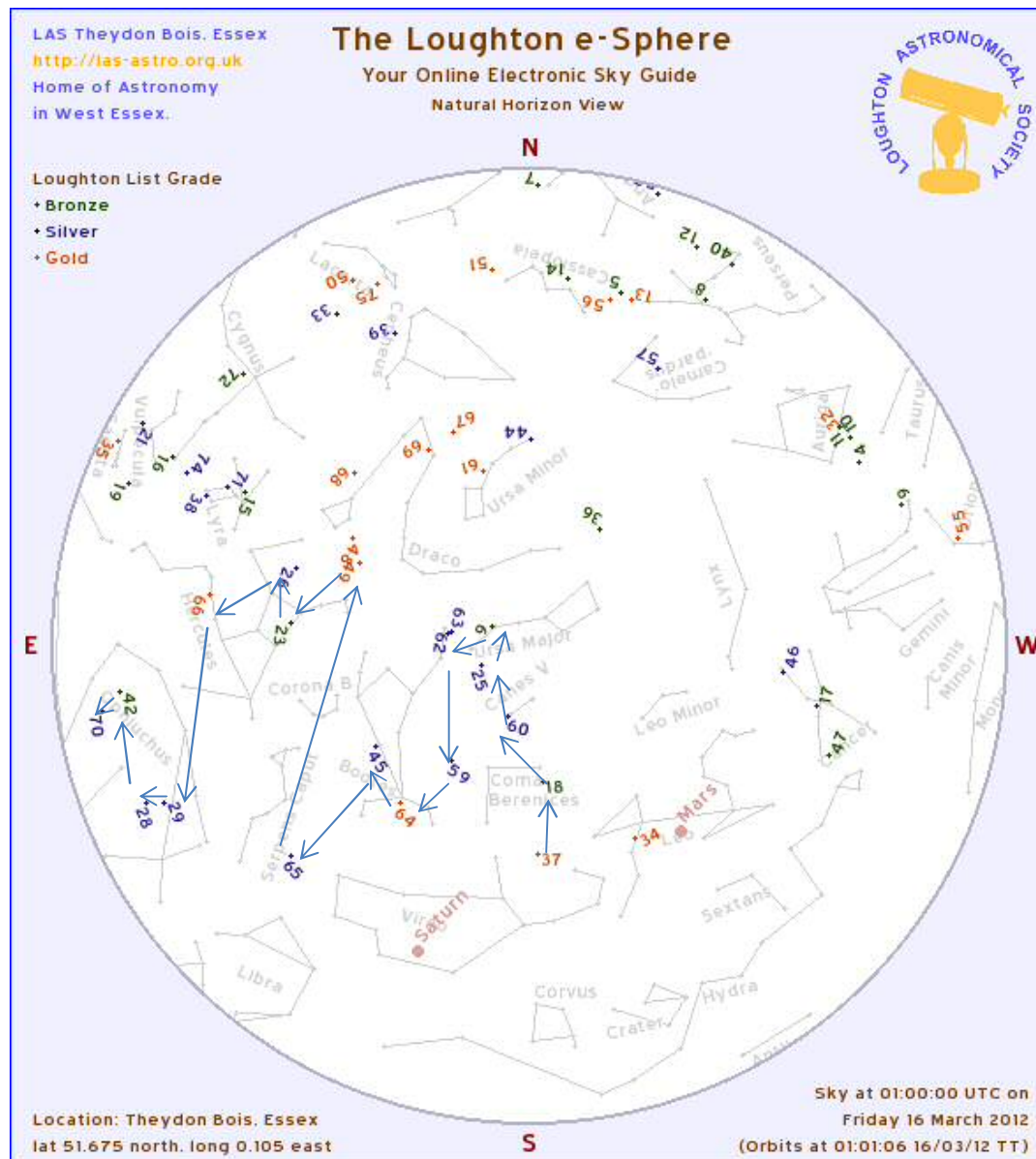
The route meanders through Perseus region before dropping down into Taurus. It then moves eastwards to Capella/Gemini/Orion – the area best known as the winter skies stars.

M41 is the lowest object and you may decide to tick it off early if the horizon is poor. There is a final jump to Cancer and Leo before finishing at LL37 – LL 18 is also shown on the next map.

This is the **last section** if you are observing in the autumn starting around mid September, as it will be rising in the early hours towards dawn. LL37 may be an object just as the sun rises and could be lost in the dawn twilight.

Map 1 usage times

March Marathon - Dusk to 1am



Loughton List Marathon #1 – suggested route for mid March. Sky as at 1am. This picks up where the first third finished - at LL 37. This is the mid section of the walk and takes you into higher declinations first of all to allow the objects in Ophiuchus to rise a bit higher.

It moves towards Ursa Major and drops back down to objects in Bootis which are at comfortable heights in the east. Then three objects in the Hercules region before the drop to Ophiuchus. NB you can divert from Serpens to Ophiuchus from object LL 65 - jumping straight to LL 29. It ends at LL70 Collinder 350. You may need to wait to 2am to see these properly.

If items are too low in the east –jump ahead to items in the north east which are in the final third of the walk but are already very visible.

Map 2 usage times

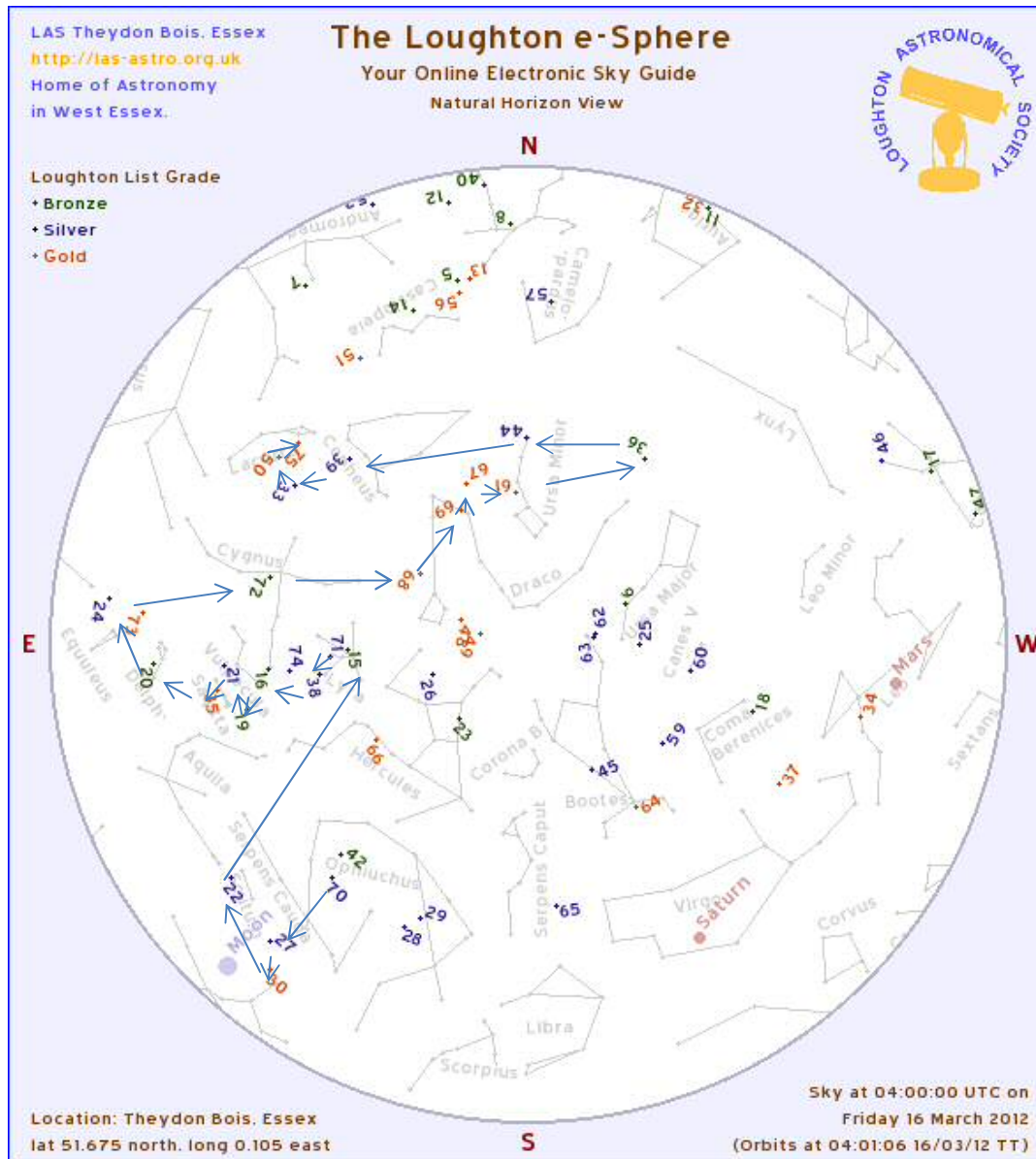
March Marathon 1am to 4am

June Marathon dusk to 3am only

September Marathon – 4am to dawn

December Marathon – Midnight to 4am.

Map 3



Loughton List Marathon 1 (March) – final third. The sky at 4am. Assuming no moon light or impending twilight, the route dips to the south east in serpens before climbing north east to objects in Lyra and then down towards the eastern horizon. LL24 which is M15 the great Pegasus globular cluster may be too low unless your horizon is clear. It then jumps up again through Cygnus to items high above in Draco and visits an object near Polaris which of course you can visit at any time in the marathon. Indeed a number of these objects can be visited before others in the middle third of the walk.

It then finishes with Cepheus and Lacerta objects – which could have been visited at the beginning of the night if the northern horizon was clear. The start point of LLM1 – LL 7 or the Andromeda galaxy should be visible low in the north east.

Map 3 usage times

March Marathon 4am to dawn.

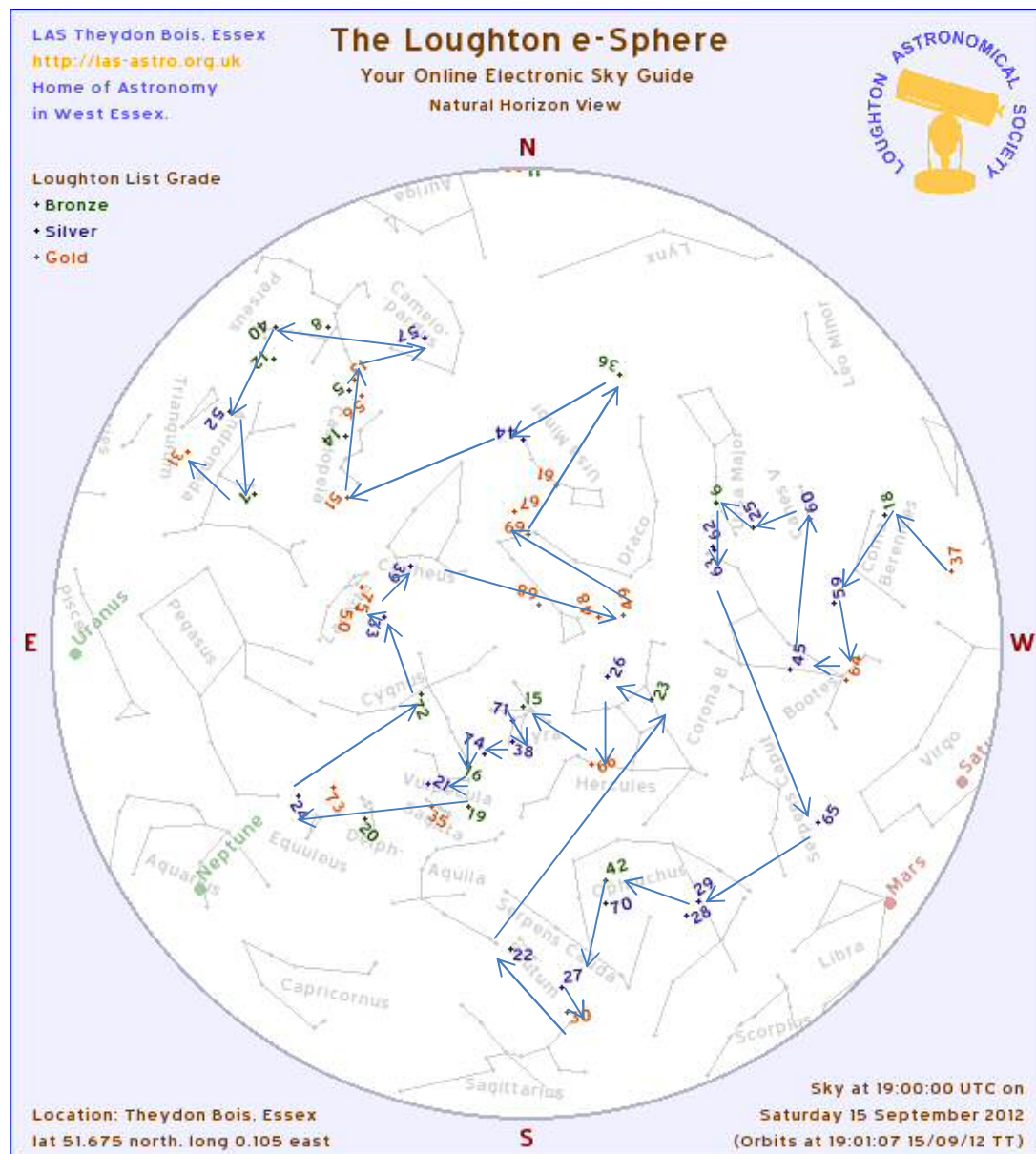
June Marathon dusk to 3am only (twilight intervenes)

September Marathon – Dusk to 11pm

December Marathon – Higher objects visible in early hours only.

Loughton List Marathon LLM3 – September – Suggested Sequence

No.	LL Ref	Object	Constellation	Grade		No.	LL Ref	Object	Constellation	Grade		No.	LL Ref	Object	Constellation	Grade
1	LL18	Melotte 111	Coma Berenices	Bronze		26	LL19	Coat Hanger	Vulpecula	Bronze		51	LL8	Melotte 20	Perseus	Bronze
2	LL59	M3	Canes Venatici	Silver		27	LL21	M27	Vulpecula	Silver		52	LL40	Algol	Perseus	Bronze
3	LL64	Picot 1	Bootis	Gold		28	LL35	M71	Sagitta	Gold		53	LL12	M34	Perseus	Bronze
4	LL45	Izar	Bootis	Silver		29	LL20	Delphinus	Delphinus	Bronze		54	LL52	NGC 752	Andromeda	Silver
5	LL60	Cor Corali	Canes Venatici	Silver		30	LL73	Toadstool	Delphinus	Gold		55	LL7	M31	Andromeda	Bronze
6	LL25	M51	Canes Venatici	Silver		31	LL24	M15	Pegasus	Silver		56	LL31	M33	Triangulum	Gold
7	LL6	Mizar/Alcor	Ursa Major	Bronze		32	LL72	M29	Cygnus	Bronze		57	LL2	M45	Taurus	Bronze
8	LL63	Iota Bootis	Bootis	Silver		33	LL33	M39	Cygnus	Silver		58	LL3	Hyades	Taurus	Bronze
9	LL62	Kappa Bootis	Bootis	Silver		34	LL50	NGC 7209	Lacerta	Gold		59	LL43	NGC 1647	Taurus	Silver
10	LL65	M5	Serp Caput	Silver		35	LL75	NGC 7243	Lacerta	Gold		60	LL11	M38	Auriga	Bronze
11	LL29	M12	Ophichus	Silver		36	LL39	Garnet Star	Cepheus	Silver		61	LL32	Cheshire Cat	Auriga	Gold
12	LL28	M10	Ophichus	Silver		37	LL68	39 Draconis	Draconis	Gold		62	LL10	M36	Auriga	Bronze
13	LL42	IC4665	Ophichus	Bronze		38	LL48	Mu Draconis	Draconis	Gold		63	LL4	M37	Auriga	Bronze
14	LL70	Col 350	Ophichus	Silver		39	LL49	16, 17 Draconis	Draconis	Gold		64	LL9	M35	Gemini	Bronze
15	LL27	M16	Serp Cauda	Silver		40	LL69	Kemble 2	Draconis	Gold		65	LL55	NGC 2169	Orion	Gold
16	LL30	M24	Sagittarius	Gold		41	LL67	Ux Draconis	Draconis	Gold		66	LL53	Col 69	Orion	Bronze
17	LL22	M11	Scutum	Silver		42	LL61	Mini Coathanger	Ursa Minor	Gold		67	LL54	Col 70	Orion	Bronze
18	LL23	M13	Hercules	Bronze		43	LL36	M81/82	Ursa Major	Bronze		68	LL58	NGC 1981	Orion	Silver
19	LL26	M92	Hercules	Silver		44	LL44	Engagement Ring	Ursa Minor	Silver		69	LL1	M42	Orion	Bronze
20	LL66	Mu Hercules	Hercules	Gold		45	LL51	NGC 7789	Cassiopeia	Gold		70	LL41	M41	Canis Major	Gold
21	LL15	Double Double	Lyra	Bronze		46	LL14	NGC 457	Cassiopeia	Bronze		71	LL47	M67	Cancer	Bronze
22	LL71	Stephenson 1	Lyra	Silver		47	LL56	Stock 2	Cassiopeia	Gold		72	LL17	M44	Cancer	Bronze
23	LL38	M57	Lyra	Silver		48	LL5	Double Cluster	Perseus	Bronze		73	LL46	Iota Cancri	Cancer	Silver
24	LL74	M56	Lyra	Silver		49	LL13	NGC 957	Perseus	Gold		74	LL34	M65/66	Leo	Gold
25	LL16	Alberio	Cygnus	Bronze		50	LL57	Kembles Cascade	Camelopardilis	Silver		75	LL37	M87	Virgo	Gold



The Loughton List Marathon #3 – suggested route **starting at dusk in mid September**. The challenge at this time of the year is to pick up objects in the west in Coma Berenices and those in the southern horizon. Its suggested that you start in the west with LL37 and follow the objects through Bootis and the western part of the plough before jumping to the south west and LL65 in Serpens. The route then moves through Ophiuchus and into vulpecula before moving westward again to pick up LL objects in Hercules.

Then the marathon moves into Lyra and Cygnus, zigzagging across the milky way and then towards the eastern horizon and rising Pegasus. By this time objects in Cepheus and Draco will be overhead and technically if these are difficult, then you can come back to them later.

After Draco move into Ursa Minor and then across the pole to the east where Cassiopeia will be rising. The first third of the marathon, finishes at around 10pm with rising Andromeda and Triangulum galaxies.

Map 4 usage times

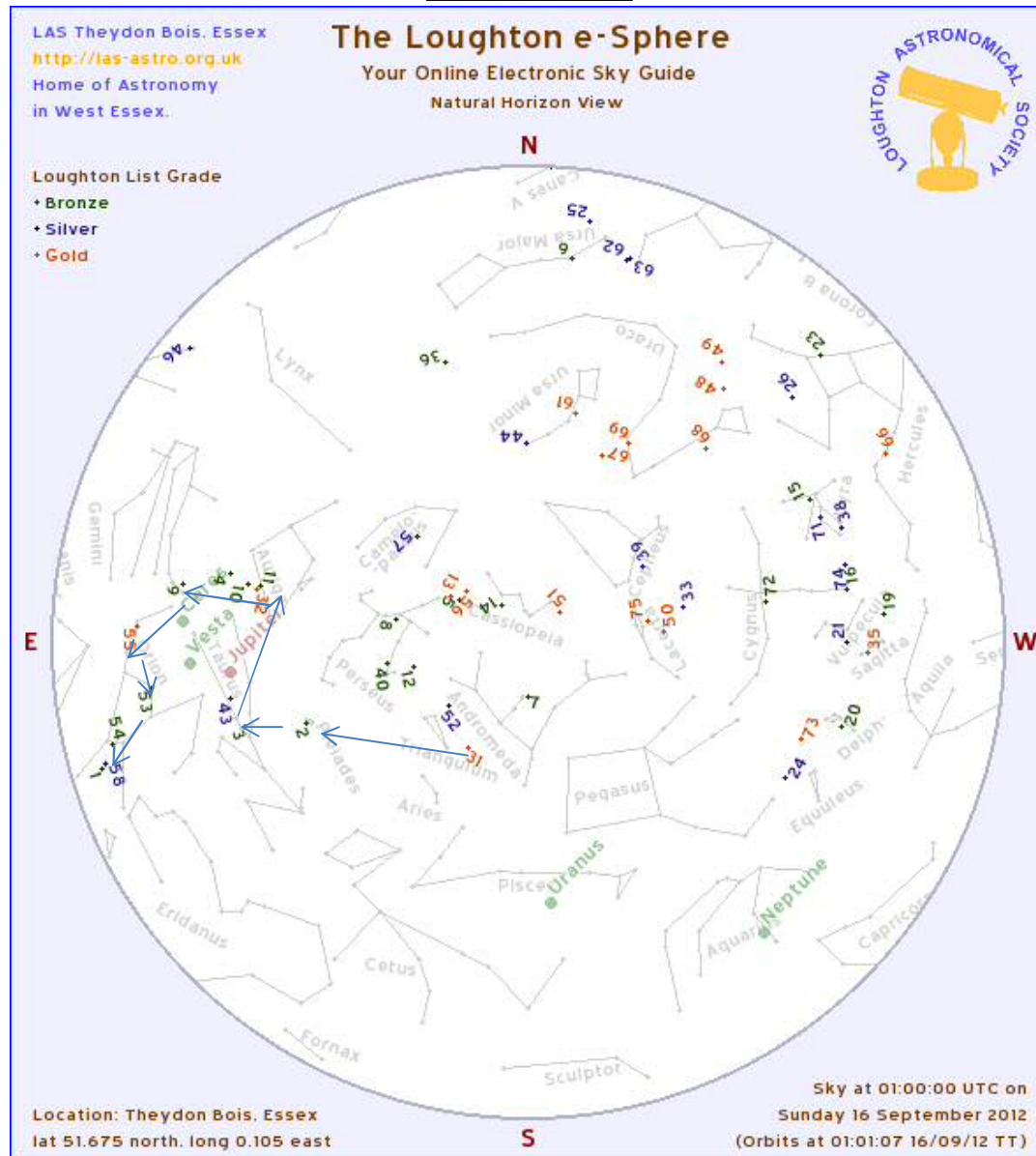
March Marathon

June Marathon 11pm to 3am only.

September Marathon – Dusk to 11pm

December Marathon –

Map 5



The Loughton List Marathon #3 – suggested route as at 1am mid September.

By midnight to 1am the second part of the September marathon appears in the east and is generally the easier objects of the Winter. Most of these are well known to seasoned observers and so can be picked off quite quickly.

Start at LL 52 near Triangulum and then overhead to Cassiopeia / Perseus region. There is a short hop into Taurus and then up to Auriga, the edge of Gemini and into Orion which will be rising in the east by this time. You now have a chance for a break before finishing off.

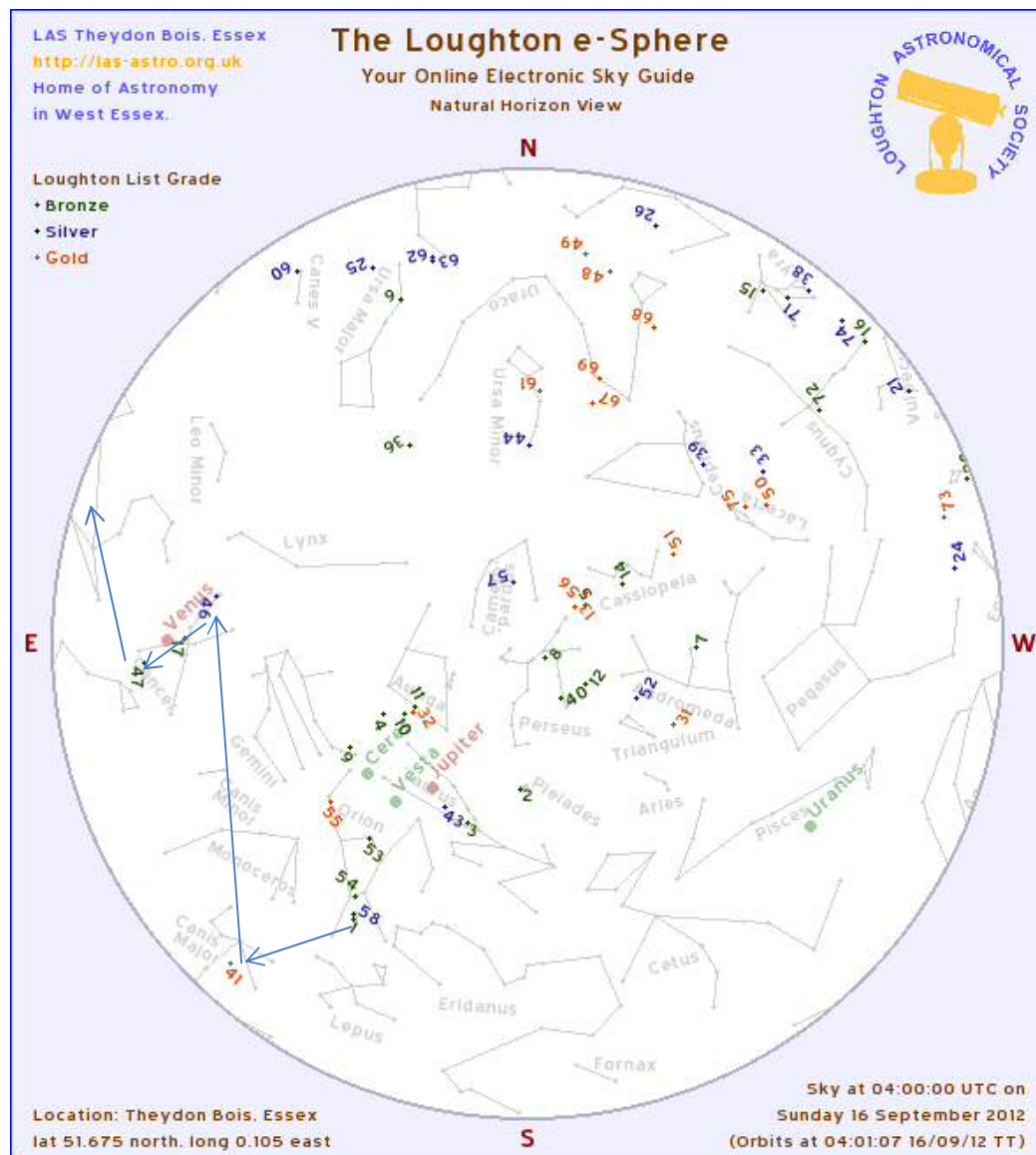
Map 5 usage times

March Marathon

June Marathon 11pm to 3am only.

September Marathon – Midnight to 2am

December Marathon – dusk onwards



The Loughton List Marathon #3 – suggested route as at 4am mid September.

By the early hours the rest of the winter objects in the list now rise above the horizon and some spring objects appear.

This stage is quite quick but it may be a while before LL 41 (Messier 41) is visible in the south east.

There is a wait until LL 46 (Iota Cancri) is visible and the route completes with LL 47.

Map 5 usage times

March Marathon dusk to midnight.

June Marathon 11pm to 3am only.

September Marathon 2am onwards

December Marathon – dusk onwards

APPENDICIES

- Loughton List in Numerical LL order (also in Introduction section)
- Loughton List sorted by Constellation Group.
- Loughton List sorted in Bronze, Silver and Gold categories
- Loughton List sorted into object type.
- Acknowledgments and sources of data and images.

Version and production detail.

Version 1.1 June 2011, 1.2 September 2011, 2.0 September 2012

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However, the idea is encouraged and members and officers of LAS would be delighted to support other societies in production of their own lists and guides.

All items in this guide were produced and written on a voluntary basis. Any charge on printed versions is to recover costs of materials and time also produced on a voluntary basis.

All efforts have been made to ensure accuracy, relevance and acknowledgement of images which have been obtained generally from internet sources or from members of the LAS. However some omissions and errors may remain. The authors and the LAS do not accept any legal responsibility in this regard.

Any corrections will be gladly received and reflected in future versions of the document.

Version 1.2 – updates and corrections to June edition.

RA and Dec corrections made to LL11, LL14, LL30, LL68

Constellation corrections made to LL22 and LL25.

Duplicated object – LL33 and LL65 both M39. LL65 becomes M5

Tables in appendix amended.

NGC 952 corrected to 957 (LL13)

Version 2.0

Addition of Loughton List Marathon section.

Replacement of images with those by LAS members, where possible.

Minor corrections to objects and locations

LL(n)	Formal name	Constellation	Grade	Type
LL7	Andromeda Galaxy	Andromeda	Bronze	Galaxy
LL52	NGC 752	Andromeda	Silver	Cluster
LL22	M11	Aquila	Silver	Cluster
LL4	M37	Auriga	Bronze	Cluster
LL10	M36	Auriga	Bronze	Cluster
LL11	M38	Auriga	Bronze	Cluster
LL32	Cheshire Cat	Auriga	Gold	Asterism
LL45	Izar	Bootes	Silver	Double
LL59	M3	Bootes	Silver	Globular
LL62	Kappa Bootis	Bootes	Silver	Double
LL63	Iota Bootis	Bootes	Silver	Double
LL64	Picot 1	Bootes	Gold	Double
LL57	kembles Cascade	Camelopardalis	Silver	Asterism
LL17	M44	Cancer	Bronze	Cluster
LL46	Iota Cancri	Cancer	Silver	Double
LL47	M67	Cancer	Bronze	Cluster
LL41	M41	Canis Major	Gold	Cluster
LL14	NGC 457	Cassiopeia	Bronze	Cluster
LL51	NGC 7789	Cassiopeia	Gold	Cluster
LL56	Stock 2	Cassiopeia	Gold	Cluster
LL39	Garnet Star	Cephus	Silver	Star
LL49	Mu Cephei	Cephus	Gold	Variable
LL18	Melotte 111	Coma Ber	Bronze	Cluster
LL60	Cor Corali	Corali	Silver	Double
LL16	Alberio	Cygnus	Bronze	Double
LL33	M39	Cygnus	Silver	Cluster
LL72	M29	Cygnus	Bronze	Cluster
LL20	Delphinus	Delphinus	Bronze	Constellation
LL73	Toadstool	Delphinus	Gold	Asterism
LL48	Mu Draconis	Draco	Gold	Double
LL67	Ux Draconis	Draco	Gold	Carbon Star
LL68	39 Draconis	Draco	Gold	Double
LL69	Kemble 2	Draco	Gold	Double
LL9	M35	Gemini	Bronze	Cluster
LL23	M13	Hercules	Bronze	Globular
LL26	M92	Hercules	Silver	Globular
LL66	Mu Hercules	Hercules	Gold	Double
LL50	NGC 7209	Lacerta	Gold	Cluster

LL75	NGC 7243	Lacerta	Gold	Cluster
LL34	M65/66	Leo	Gold	Galaxy
LL15	Double Double	Lyra	Bronze	Double
LL38	M57	Lyra	Silver	Nebula
LL71	Stephenson 1	Lyra	Silver	Cluster
LL74	M56	Lyra	Silver	Globular
LL28	M10	Ophichus	Silver	Globular
LL29	M12	Ophichus	Silver	Globular
LL42	IC4665	Ophichus	Bronze	Cluster
LL70	Coll 350	Ophichus	Silver	Cluster
LL1	M42	Orion	Bronze	Nebula
LL53	Col 69	Orion	Bronze	Cluster
LL54	Col 70	Orion	Bronze	Cluster
LL55	NGC 2169	Orion	Gold	Cluster
LL58	NGC 1981	Orion	Silver	Cluster
LL24	M15	Pegasus	Silver	Globular
LL5	Double Cluster	Perseus	Bronze	Cluster
LL8	Melotte 20	Perseus	Bronze	Cluster
LL12	M34	Perseus	Bronze	Cluster
LL40	Algol	Perseus	Bronze	Variable
LL30	M24	Sagittarius	Gold	Star Cloud
LL35	M71	Sagitta	Gold	Globular
LL65	M5	Serpens Caput	Silver	Globular
LL27	M16	Serpens Cauda	Silver	Nebula
LL2	M45	Taurus	Bronze	Cluster
LL3	Hyades	Taurus	Bronze	Cluster
LL43	NGC 1647	Taurus	Silver	Cluster
LL31	M33	Triangulum	Gold	Galaxy
LL6	Mizar/Alcor	Ursa Major	Bronze	Double
LL13	NGC 952	Ursa Major	Gold	Cluster
LL25	M51	Ursa Major	Silver	Galaxy
LL36	M81/82	Ursa Major	Bronze	Galaxy
LL44	Engagement Ring	Ursa Minor	Silver	Asterism
LL61	Mini CoatHanger	Ursa Minor	Gold	Asterism
LL37	M87	Virgo	Gold	Galaxy
LL19	Coat Hanger	Vulpecula	Bronze	Cluster
LL21	M27	Vulpecula	Silver	Nebula

LL1	M42	Orion	Bronze	Nebula
LL2	M45	Taurus	Bronze	Cluster
LL3	Hyades	Taurus	Bronze	Cluster
LL4	M37	Auriga	Bronze	Cluster
LL5	Double Cluster	Perseus	Bronze	Cluster
LL6	Mizar/Alcor	Ursa Major	Bronze	Double
LL7	Andromeda Galaxy	Andromeda	Bronze	Galaxy
LL8	Melotte 20	Perseus	Bronze	Cluster
LL9	M35	Gemini	Bronze	Cluster
LL10	M36	Auriga	Bronze	Cluster
LL11	M38	Auriga	Bronze	Cluster
LL12	M34	Perseus	Bronze	Cluster
LL14	NGC 457	Cassiopeia	Bronze	Cluster
LL15	Double Double	Lyra	Bronze	Double
LL16	Alberio	Cygnus	Bronze	Double
LL17	M44	Cancer	Bronze	Cluster
LL18	Melotte 111	Coma Ber	Bronze	Cluster
LL19	Coat Hanger	Vulpecula	Bronze	Cluster
LL20	Delphinus	Delphinus	Bronze	Constellation
LL23	M13	Hercules	Bronze	Globular
LL36	M81/82	Ursa Major	Bronze	Galaxy
LL40	Algol	Perseus	Bronze	Variable
LL42	IC4665	Ophichus	Bronze	Cluster
LL47	M67	Cancer	Bronze	Cluster
LL53	Col 69	Orion	Bronze	Cluster
LL54	Col 70	Orion	Bronze	Cluster
LL72	M29	Cygnus	Bronze	Cluster
LL13	NGC 952	Ursa Major	Gold	Cluster
LL30	M24	Sagittarius	Gold	Star Cloud
LL31	M33	Triangulum	Gold	Galaxy
LL32	Cheshire Cat	Auriga	Gold	Asterism
LL34	M65/66	Leo	Gold	Galaxy
LL35	M71	Sagitta	Gold	Globular
LL37	M87	Virgo	Gold	Galaxy
LL41	M41	Canis Major	Gold	Cluster
LL48	Mu Draconis	Draco	Gold	Double
LL49	Mu Cephei	Cephus	Gold	Variable

LL50	NGC 7209	Lacerta	Gold	Cluster
LL51	NGC 7789	Cassiopeia	Gold	Cluster
LL55	NGC 2169	Orion	Gold	Cluster
LL56	Stock 2	Cassiopeia	Gold	Cluster
LL61	Mini CoatHanger	Ursa Minor	Gold	Asterism
LL64	Picot 1	Bootes	Gold	Double
LL66	Mu Hercules	Hercules	Gold	Double
LL67	Ux Draconis	Draco	Gold	Carbon Star
LL68	39 Draconis	Draco	Gold	Double
LL69	Kemble 2	Draco	Gold	Double
LL73	Toadstool	Delphinus	Gold	Asterism
LL75	NGC 7243	Lacerta	Gold	Cluster
LL21	M27	Vulpecula	Silver	Nebula
LL22	M11	Aquila	Silver	Cluster
LL24	M15	Pegasus	Silver	Globular
LL25	M51	Ursa Major	Silver	Galaxy
LL26	M92	Hercules	Silver	Globular
LL27	M16	Serpens Cauda	Silver	Nebula
LL28	M10	Ophichus	Silver	Globular
LL29	M12	Ophichus	Silver	Globular
LL33	M39	Cygnus	Silver	Cluster
LL38	M57	Lyra	Silver	Nebula
LL39	Garnet Star	Cephus	Silver	Star
LL43	NGC 1647	Taurus	Silver	Cluster
LL44	Engagement Ring	Ursa Minor	Silver	Asterism
LL45	Izar	Bootes	Silver	Double
LL46	Iota Cancr	Cancer	Silver	Double
LL52	NGC 752	Andromeda	Silver	Cluster
LL57	kembles Cascade	Camelopardalis	Silver	Asterism
LL58	NGC 1981	Orion	Silver	Cluster
LL59	M3	Bootes	Silver	Globular
LL60	Cor Corali	Corali	Silver	Double
LL62	Kappa Bootis	Bootes	Silver	Double
LL63	Iota Bootis	Bootes	Silver	Double
LL65	M5	Serpens Caput	Silver	Globular
LL70	Coll 350	Ophichus	Silver	Cluster
LL71	Stephenson 1	Lyra	Silver	Cluster
LL74	M56	Lyra	Silver	Globular

LL(n)	Formal name	Constellation	Grade	Type
LL32	Cheshire Cat	Auriga	Gold	Asterism
LL44	Engagement Ring	Ursa Minor	Silver	Asterism
LL57	kembles Cascade	Camelopardalis	Silver	Asterism
LL61	Mini CoatHanger	Ursa Minor	Gold	Asterism
LL73	Toadstool	Delphinus	Gold	Asterism
LL67	Ux Draconis	Draco	Gold	Carbon Star
LL2	M45	Taurus	Bronze	Cluster
LL3	Hyades	Taurus	Bronze	Cluster
LL4	M37	Auriga	Bronze	Cluster
LL5	Double Cluster	Perseus	Bronze	Cluster
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LL18	Melotte 111	Coma Ber	Bronze	Cluster
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LL22	M11	Aquila	Silver	Cluster
LL33	M39	Cygnus	Silver	Cluster
LL41	M41	Canis Major	Gold	Cluster
LL42	IC4665	Ophichus	Bronze	Cluster
LL43	NGC 1647	Taurus	Silver	Cluster
LL47	M67	Cancer	Bronze	Cluster
LL50	NGC 7209	Lacerta	Gold	Cluster
LL51	NGC 7789	Cassiopeia	Gold	Cluster
LL52	NGC 752	Andromeda	Silver	Cluster
LL53	Col 69	Orion	Bronze	Cluster
LL54	Col 70	Orion	Bronze	Cluster
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LL60	Cor Corali	Coral	Silver	Double
LL62	Kappa Bootis	Bootes	Silver	Double
LL63	Iota Bootis	Bootes	Silver	Double
LL64	Picot 1	Bootes	Gold	Double
LL66	Mu Hercules	Hercules	Gold	Double
LL68	39 Draconis	Draco	Gold	Double
LL69	Kemble 2	Draco	Gold	Double
LL7	Andromeda Galaxy	Andromeda	Bronze	Galaxy
LL25	M51	Ursa Major	Silver	Galaxy
LL31	M33	Triangulum	Gold	Galaxy
LL34	M65/66	Leo	Gold	Galaxy
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LL29	M12	Ophichus	Silver	Globular
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LL59	M3	Bootes	Silver	Globular
LL65	M5	Serpens Caput	Silver	Globular
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LL1	M42	Orion	Bronze	Nebula
LL21	M27	Vulpecula	Silver	Nebula
LL27	M16	Serpens Cauda	Silver	Nebula
LL38	M57	Lyra	Silver	Nebula
LL39	Garnet Star	Cephus	Silver	Star
LL30	M24	Sagittarius	Gold	Star Cloud
LL40	Algol	Perseus	Bronze	Variable
LL49	Mu Cephei	Cephus	Gold	Variable

Acknowledgements and Sources.

Object	Source	Other
Collinder 70	http://www.backyard-astro.com/deepsky/bino/02_b.html	Drawn by Skytools from Capella Soft
	http://www.cloudynights.com/ubbthreads/attachments/3463840-BeltSword_5min_135mm%20%28Medium%29.jpg	
M35	http://www.kolumbus.fi/jaakko.saloranta/Deepsky/Messier/M35_SA.gif	
NGC 457	http://www.stardoctor.org/457.htm	Ruben Keuller. Tech 140 refractor.
Kemble 2	http://www.kolumbus.fi/jaakko.saloranta/Deepsky/Extra/Kemble2.gif http://www.deep-sky.co.uk/asterisms/kemble2.jpg	
M16	i Image: Palomar Observatory, Caltech	
M10	Image: Palomar Observatory, Caltech	
M12	mage: REU program/NOAO/AURA/NSF	
M24	Image: Vanessa Harvey, REU program/NOAO/AURA/NSF	
M39	Image: NOAO/AURA/NSF	
M71	<i>Image: REU program/NOAO/AURA/NSF</i>	
M81/82	<i>Image: Karel Teuwen and Deitmar Hager, F.R.A.S. of Northern Galactic</i>	
M87	<i>ImageNOAO/AURA/NSF</i>	
M38	Map: http://commons.wikimedia.org Photo: www.paulandliz.org	
M34	Photo: http://www.deepskyobserving.com	
NGC 957	Map: http://www.cloudynights.com Photo: http://www.lowohm.com	

LL28 M10 Minimum credit line: *N.A.Sharp, Vanessa Harvey/REU program/NOAO/AURA/NSF (for details see Conditions of Use)*

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LL61 – The mini coat hanger - Greg Parker - New Forest Observatory, Hampshire, U.K. <http://www.newforestobservatory.com/>